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LEPROSY WITH ESPECIAL REFERENCE TO OPHTHALMOLOGIC FINDINGS.

ARTHUR M. YUDKIN, M. D.

NEW HAVEN, CONN.

A review of the literature relating to the ocular lesions observed in leprosy; with a report of two cases, studied at the New Haven Hospital. With illustrations showing areas of anesthesia, and with a bibliography.

In the last ten years three sporadic cases of leprosy have been reported in the State of Connecticut. Recently a leper came to the clinic for a nose condition which was treated as a syphilitic lesion. On further examination acid-fast bacilli were found in the nasal secretion. The patient was then given a thorough investigation and classified as a case of leprosy of the maculo-anesthetic type. He also presented an eye condition which will be described in detail later. The diagnosis was confirmed by Dr. James A. Honeij. This patient was immediately isolated for further observation and study.

It is rather unusual that another case of the same type and stage of invasion should have been isolated at this institution at the same time. An opportunity was offered to study these cases in a well regulated isolation hospital. We have been able to compare carefully the various physical, anatomic and metabolic changes; and the infrequency of a full description in American literature and text-books on ophthalmology of the ocular changes found in leprosy, has prompted me to present these cases.

Leprosy is a chronic communicative disease caused by the bacillus lepra of Hansen and in its evolution assumes two distinct forms—the nodular or lepra tuberosa, and anesthetic or nerve leprosy. The mixed type is a combina-

tion of the two forms. It is characterized by cutaneous and constitutional symptoms, alteration in all tissues as well as in bony and nerve structure, resulting in anesthesia, ulceration, necrosis, atrophy and frequently ending fatally. Bacilli resembling the typical acid-fast bacilli of leprosy have been found in the circulating blood and excretions by Honeij and other investigators frequently enough to make us believe that leprosy is a systemic disease and may at some period of its evolution affect any or all the units of the human body.

The eye, like the other organs of the body, is invaded by this disease but much less frequently and markedly. Lopez, in his study of the disease at the hospital of San Lazaro in Havana, notes that if we include in the study of the eye the adnexa tissues—the lids and lacrimal apparatus—every case has some ophthalmologic lesion during its course. Kaurin of Norway found that two-thirds, and even three-fourths of the lepers presented ocular lesions. Fernandez had the opportunity of seeing a great many ocular manifestations of leprosy. He believes that in many cases the eye is affected primarily, as evidenced by the great number of bacilli found in the superficial layers of the lesions. Many investigators (among them Espada) consider the ocular manifestations to be secondary in na-

ture and not primary. All authors agree, however, that the anterior segment of the eye is most frequently attacked.

Leprosy is probably known to many by the peculiar and characteristic physiognomy it sometimes assumes. The face is often the site of predilection for leprous nodules. They frequently mass in great numbers over this region and sometimes produce the leonine countenance. Because of infiltration the brows deeply overhang the orbit, the lids assume a state of ptosis, the nose and ears are enlarged, the lips thickened, the jowls massive and wrinkled. Lopez in his study of eighty cases notes that almost every leper, from the beginning of his illness, finds his eyelids attacked either by anesthetic patches or by nodules with deformity of the lids and with destruction also of the hair follicles. Grossman, from his observations in Iceland, finds that the nodular form of the disease (which is there the most common) is always attended with eye lesions unless the patient dies early. On the other hand, the anesthetic type may leave the eye and its adnexa unaffected. The nodular lesions often begin in the lids and later may attack the eyeball, although this is not always the case, and lesions of the eye frequently occur without marked outer changes.

The loss of eyelashes and eyebrows occurs quite early in the disease. Lopez explains this process of madarosis by the diminution of temperature and destruction of glandular elements of the tegumentary system. It commences in an anesthetic patch on the naked skin, which becomes dry and the function of the hair follicles destroyed. Hart presented a case of this description.

In five hundred cases of leprosy de Silva saw one hundred and one suffering from ocular lesions. Twenty-three of them were of the nodular type. He found facial paralysis in seven cases, which caused lagophthalmus. Lopez, in his cases, demonstrated that ectropion is a frequent occurrence. He differentiates the condition of ectropion found in senile individuals from that of leprosy in that the latter condition is

caused by a leprous plaque. This lesion is caused by a "leprous agency" which destroys the glandular elements in their turn, then attacks the terminal filaments and paralyzes the twigs of the seventh nerve and thus contributes to the palpebral eversion.

Honeij has noticed that the lacrimal duct became occluded, which necessitated occasional probing. This undoubtedly was caused by inflammatory processes. Morrow and Lee mention among eye symptoms excessive lacrimation which is followed by a marked xerosis, causing atrophic shrinking of the mucous membrane. This condition is true in many cases of leprosy because of the relaxation of the orbicularis palpebrarum, due to the paralysis of the facial nerve. The ectropion condition is caused by the leprous anesthetic plaque. Anesthesia of ocular and palpebral conjunctiva is frequent among all types of leprosy, and is almost constant in the anesthetic type.

Lopez notes that anesthesia, inflammation, pterygia and nodules are the outstanding manifestations of the conjunctival invasion. Through lid defects and anesthesia of the conjunctiva the exposed eye is often irritated by dust and substances in the air. In consequence of this an inflammatory condition is set up with marked congestion and mucoid discharge, followed, if unchecked, by chronic conjunctivitis. This goes on, leading to ulceration of the cornea, staphyloma and frequently necrosis and atrophy.

Like the rest of the body, the conjunctiva is infiltrated with the typical leprous nodule called by many authors lepromata. This manifestation of leprosy aids in irritating the conjunctiva, setting up a conjunctivitis, lacrimation and photophobia, and at times, pain. Because of the unusual condition, pterygia are found quite frequently, and may be on any conceivable portion of the sclera. The site of predilection of the leproma is the sclero-corneal region. It is at first slightly translucent, anemic, and pale grayish-yellow in color. It is often mistaken in its early stage for leucosarcoma, or a pseudovernal catarrhal condition. Grossmann,

Meller, Axenfeld, Roche, Sauvineau and Morax observed that the pericorneal area was most frequently invaded. Schirmer presented a case of this type in which he found the lepra bacillus in abundance.

The most prominent lesions of the cornea are anesthesia, nodules and several forms of keratitis. The cornea is affected late in the disease, being invaded by the nodule. Many theories have been advanced as to the method of invasion. Karnitsky and Weinstein note that leproma of the cornea is never primary, but extends from nodules in the sclero-corneal margin or from the canal of Schlemm. In case they take their origin from the former structure, the nodules raise the surface of the cornea; but if the invasion comes by way of Schlemm's canal, deep infiltration appears in front of Descemet's membrane. In the case reported, the leproma occupied two-thirds of the cornea and the neighboring sclera. The tumor was very vascular and consisted of round, spindle-shaped epithelioid cells, covered with several layers of epithelium which grew into the depth of the tumor. The lepra bacilli were found in great numbers. According to Fernandez, leproma of the cornea is very rare, but leprous keratitis is very frequent.

Scrapings of the infiltrated cornea were made by Gabrielides, who found the acid-fast bacilli in abundance both in the cells and between them. In a case described by Sauvineau and Morax the histologic examination revealed extreme infiltration of the corneal layers. The membrane of Bowman had disappeared and that of Descemet was in shreds, but the epithelium was unaffected. Axenfeld believes that the keratitis of leprosy is much more common than one would gather from the clinical reports, since he found bacterial colonies in cases with clinically clear cornea, which is in accord with the findings of Jeanselme and Morax. Roche observed a case of leprous keratitis which was symmetric. The corneal infiltrate had the appearance of fat and extended from the limbus to the center of the cornea, gradually les-

sening until it ended in a vertical line. Meller reports a case of keratitis punctata leprosa from Fuch's clinic. Both corneas were the seat of innumerable sharply circumscribed, intensely white dots, which were situated just beneath the epithelium, and were distinguished from the spots of superficial punctate keratitis by their sharply defined margins and intensely white color. Anatomic examination of portions of tissue removed from the cornea showed the spots were filled with clumped lepra bacilli, mingled with round cells.

Leprous keratitis offers a certain analogy with the interstitial keratitis found in hereditary syphilis. The stigmata are different, however, and there is a different pathologic history. The keratitis of leprosy may be of interstitial type, superficial, or deep punctate. The syphilitic condition is accompanied by photophobia, lacrimation and conjunctival injection, whereas leprosy may show no particular signs of an active lesion. In the latter, the sclero-corneal region most often shows the first sign of opacity which follows the circumferential curve of the cornea; it becomes more and more accentuated as the disease progresses. It, however, leaves the central portion free for a long time, and the lesion is frequently symmetric, although it is generally in different stages in each eye.

In syphilis the opacity usually starts in the center and extends in all directions; the borders of the lesions are diffuse and the cornea is steamy, resembling ground glass. Often a marginal infiltration is found, but there are transparent portions in places, whereas in leprosy there is usually none. The syphilitic variety shows signs of improvement under specific treatment, whereas the leprous keratitis progressively goes on to ulceration and atrophy. Otchapovski has seen several cases where the cornea has ulcerated thru.

Anesthesia of the cornea is not found in all cases, but when it is, the area can be touched without eliciting an oculopalpebral reflex. Lopez has more than once seen flies sucking the material which exuded from the ocular tissue,

without the patient showing by the slightest wink that there was any sensibility in this region.

Most authors include the iris in the anterior segment of the eye. The most important lesions found here are nodules and iritis. The nodule may develop on any part of the iris, but probably the most favorable place is at the iris angle, or at the circulus iridis major. The iris has been the seat of leprosy manifestations in half the cases studied by Espada. Besides a serous iritis he has observed a special form in which the color of the iris was not affected, and in which numerous grayish points about the size of a pinhead were to be observed on its surface, these points being especially abundant in the neighborhood of the sphincter. In one case this miliary eruption was not accompanied by any marked reaction. In another the pupillary margin was bound down by posterior synechiae. In the first case all signs of iritis were plastic with the formation of a more or less thick pupillary exudate and more or less serious affection of sight.

The ciliary body is often involved, but it is rare to have on this account any acute symptoms, the only sign of cyclitis being deposits of exudate on the posterior corneal surface. Lesions of the crystalline lens are rare. When any occur, they are due to the invasion of the ciliary body. The lens matter loses its transparency, mainly thru nutrition changes.

In eighty-one cases of leprosy examined with the ophthalmoscope Trantas found changes in the eye grounds in 68 per cent. In 26 cases the anterior part of the retina, rendered visible by pressure with the finger on the ciliary region, showed small white dots, sometimes coalescing into large spots. Farther back in the fundus were spots marked by an extensive pigmentation. The retinal lesions on histologic examination were found to consist of thickening of the inner layer of the retina with slight cell infiltration and proliferation of the granular layers. Most observers agree with Lopez that in the advanced stage of ocular lesions the retina and choroid are also involved, but

early cases examined with the ophthalmoscope showed no lesions in the fundus.

Many attempts have been made to check the ravages of leprosy in ocular lesions. Grossman has suggested scarifying the lesion by incision. Trantas has energetically cauterized superficial lesions as they appear, and thus protected the eye from deeper invasion. To avoid mechanical action of the dust and irritating substances of the air, the eye should be treated as for a neuromyasthenic condition. Cataracts have been successfully removed from leprosy individuals. Atropin should be used in ulceration of the cornea and iritis. Bland ointments relieve irritation. As yet there has been no specific treatment found to remedy the ocular conditions, as eye lesions are only a local manifestation of leprosy and can be affected only when the disease as a whole is successfully treated.

CASE REPORTS.

Case No. 1.—G. C. An Italian laborer, born in the County of Vanevendo, Italy, twenty-one years ago. Came to this country four years ago. Entered clinic because of difficulty in breathing thru his nose. Present condition started two years ago when he was troubled with a feeling of dryness in his nose. On forced cleaning scab-like masses were expelled. Troubled now and then with slight epistaxis which was checked spontaneously. Subject to cold sweats; does not cough, however, nor run an afternoon temperature. Patient does not complain of pulmonary, digestive, cardiac nor urogenital symptoms. Wears glasses; sight good, however. Upper extremities occasionally "fall asleep" and give a tingling sensation.

Has had none of the children's diseases. Gives no history of exposure to leprosy nor tuberculosis. Has always enjoyed the best of health. Denies lues or gonorrhea. Father died of some unknown malady at the age of 65 years. Brothers and sisters in America show no leprosy lesions. Mother and sisters in Italy in good health. Habits negative.

Patient apparently in good condition,

suffering from no particular pain. Has luxuriant growth of hair but beard is very slight. No facial nor ocular paralysis.

Eyes.—Lids are thickened. Has one or two nodules on orbicular prominences. Shows areas of anesthesia but no paralysis. Eyelashes normal. Presents slight conjunctivitis of both eyes. The ocular and palpebral conjunctivae are anesthetic and show congestion. There are no nodules nor pterygia present. But at the sclero-corneal margin, on the temporal side, is a nodule about 1 mm. x 2 mm. It is markedly elevated but not vascular; has, however, a fair blood supply arising from two conjunctival vessels from the outer canthus. The process is grayish-yellow in color, and continuous with a band of infiltration which surrounds a good portion of the sclero-corneal circumference for about one millimeter wide. The edge is diffuse and the whole resembles ground glass. The lesion is symmetric but the process on the left side not as marked. The oculo-palpebral reflex is not elicited when the nodule is pricked with a pin. The cornea, other than the periphery, is clear, but has a sluggish sensation reaction. There is nothing abnormal about the iris. The pupil reacts to light and accommodation. The examination of the fundus is negative.

The nose externally is negative. Internal examination shows the nares plugged with atrophic scabs, from which smears were made and the acid-fast bacillus of Hansen found. On clearing off the scabs, there is a perforation of the nasal septum 5x3 mm. in height, which does not seem to include the bony structure. The inferior and middle turbinates show atrophic changes. Transillumination of the sinuses is negative.

The rest of the examination is negative, except for the skin and the neurologic findings.

There are numerous small brownish-red patches on the face, the arms, buttocks, lower part of thighs and legs, which have no special form nor size, varying from a pin-point to 4 and 5 cm. The trunk shows none of these colored

pigmented areas, except an area of vitiligo on the back in the region of the 4th, 5th, 6th and 7th vertebrae. Accompanying these pigmented areas are nodules, most of which are anesthetic, and which vary in size from a small pea to a peach-stone. They are more noticeable on bony prominences such as the orbicular prominence, the elbow and wrist. There is also a general glandular enlargement in the cervical, axillary and inguinal regions.

On deep palpation the ulnar nerves are found to be thickened and nodular, more markedly so on the left side. The same thickening is found in the anterior peroneal and popliteal nerves. The areas of anesthesia are seen on the accompanying chart.

Laboratory findings: Urine examination negative; Wassermann taken before entering hospital negative. A later Wassermann at the hospital was shown to be positive, 2+. Blood examination: R. B. C. 5,636,000; W. B. C. 7,000; P. 76; L. M. 1; S. M. 23; E. O.; B. O. Smear negative. Hemoglobin 95.

Case No. 2.—M. T. (Case referred by Dr. John E. Lane.) A Greek laborer, born in Argalaste, Greece, thirty-one years ago. Came to this country in July, 1912. Entered clinic because of "red spots on his body." A few spots first appeared on the face, which in the beginning were small and red, later becoming brownish and larger. The feet were next affected; following these the arms and hands. Lesions are not painful, have never itched, never broken down to form ulcers. Patient claims he feels well and the lesions do not trouble him in the least. For less than a year the left side of the nose has been almost completely blocked. Has had no previous catarrhal condition. Eyesight good; wears no glasses.

Measles as a child. Always well; never in bed for any illness. Denies lues and gonorrhea. Father living and well. Mother, one sister and two brothers living and well. No history of similar trouble in family or amongst relatives. No history of tuberculosis in family. Habits negative.

Patient well developed and nour-

ished. Has good color. Shows no facial nor ocular paralysis.

Eyes.—Lids are slightly thickened. Has two nodules on orbicular prominences. Shows no areas of anesthesia

Corneas clear. Pupils react to light and accommodation. Iris normal. Fundus examination shows nothing abnormal.

Internal examination of the nose shows a deflected septum which is

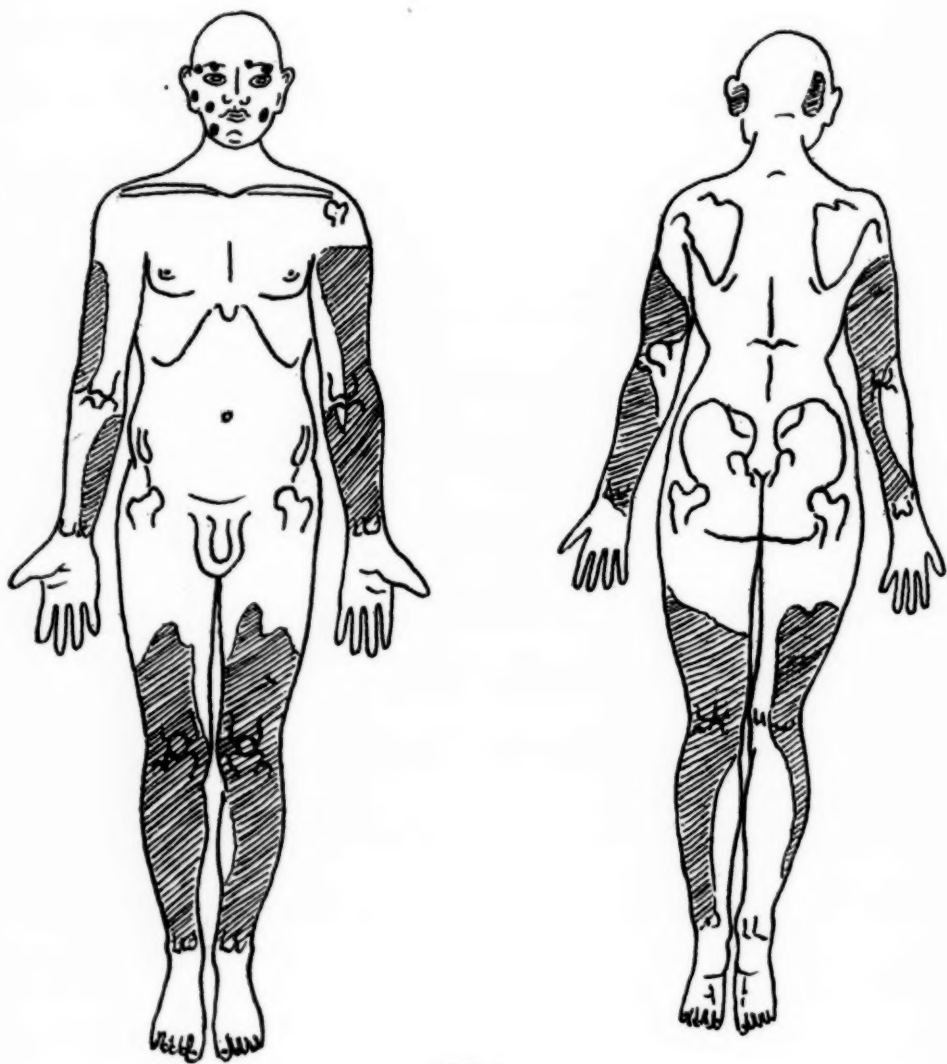


FIG. 1.
Areas of anesthesia in Case I. (Yudkin).

except for a small plaque on the upper left lid, which also shows madarosis. The ocular and palpebral conjunctiva are somewhat congested. The sclera is clear in both eyes. The sclero-corneal junction shows nothing abnormal.

markedly thickened on the left side and with the middle turbinal occludes the upper nasal passage. The septum shows deeply excavated ulceration with ragged edges, pale in color, which bleeds very easily. Here and there

may be seen small whitish nodules on a pale mucous membrane. The inferior turbinates show an atrophic condition.

The face and forehead show numerous flat papules 2-4 mm. in size, which are light brown in color. On the right cheek there is a large infiltrated area 1 cm. in diameter, and two similar areas on the left cheek. There are also areas of brownish pigmentation of irregular outline present. On the left side of the forehead is a large projecting nodule 1.5 cm., occupying the skin and subcutaneous tissue, with considerable pigmentation around it. On the forearm and elbows, especially the extensor surface, are numerous flat papules of dull red color and rather soft consistency. There are also numerous areas without pigmentation. The trunk is almost free from eruption. The buttocks, front of thighs and lower legs, both in front and behind, show similar lesions, those on the lower legs somewhat larger and of a reddish color. The soles show several papules, the palms no lesions. On the left shin in front is an irregular thickened area 5 cm. in diameter with brownish pigmentation and scale formation.

Both ulnar nerves are greatly thickened throughout their course, somewhat irregularly, and at the elbow are about three times the normal size. The external peroneal nerves are similarly affected, also the popliteal nerves. The large lesion on the left shin is totally anesthetic. Many of the larger papules are also anesthetic. On the pigmented areas there is normal or slightly impaired sensation. Sensation, apart from the skin lesions, appears normal with rough tests.

Laboratory examinations: Urine examination, negative; Wassermann reaction + + + +; Blood examination: W. B. C. 11,000; P. 75; L. M. 5; S. M. 20; E O; B O. Smear shows achromia.

RESUMÉ.

The eye is invaded by the *lepra bacillus* of Hansen. It is usually secondary to a focus in some other part of the body. The majority of investigators agree that the anterior segment is the most frequently invaded. The lids may show marked thickening, nodules, areas of anesthesia, lagophthalmus, ectropion and madarosis. Epiphora is often due to the plugging by the chronic inflammatory process going on in the puncta and ducts of the lacrimal apparatus. In leprosy one often meets with conjunctivitis, which is due to two causes, one traumatic and the other symptomatic. When the conjunctiva is anesthetic and lagophthalmus and ectropion are present, the eye is predisposed to contract catarrhal conjunctivitis with a mucous or muco-purulent discharge. The chronic form is due exclusively to contact with external agents. The corneal changes are frequent and varied. A nodule of the sclero-corneal margin is usually accompanied by a belt of leprosy infiltration of the cornea. The keratitis is of two varieties, one the interstitial and the other the superficial or deep punctate variety. Sometimes a leproma may invade the center of the cornea. This is followed by a thinning of the membrane, which, when the intraocular pressure increases, may give rise to a staphyloma; or, if secondary infection invades the territory, there is ulceration, perforation and atrophy. The iris is affected in two ways (1) by the nodule in the region of greatest vascularity and (2) by iritis. The choroid and retina are less liable to be attacked in leprosy than other parts of the eye. When loss of vision is present, it is due to the invasion of the anterior rather than the posterior segment.

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A CASE OF TRAUMATIC PULSATING EXOPHTHALMOS.

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This patient was seen before the beginning of proptosis, and watched during the development of the symptoms, the ligation of the carotid and the subsequent recovery of ocular position and movement, but with optic atrophy.

The following case history is recorded because it was possible for me to observe the ocular symptoms from the beginning, to note the progress of the disease, see the changes in the fundus when the carotid artery was tied, follow the patient through brain edema and to report the end result, a retained, freely movable eyeball.

Mrs. M. H., married, aged 66, was first seen by her physician, Dr. J. P. O'Brien, September 8, 1914. Family history negative, personal history negative, having always been healthy, well nourished, active and cheerful.

For three weeks, she has been complaining of a severe toothache like pain over the right parietal region, extending from the occipital area behind to the frontal and nasal regions in front, at times this pain is paroxysmal and accompanied by nausea and vomiting. While down in the cellar about one month before the pain was first noticed, she quickly straightened up from a stooping position and struck her head in the right parietal region against a beam. The injury caused severe pain and dizziness for a few days.

Bowels regular, once or twice a day. Urine negative. Temperature 98.2. Lungs negative. Heart: first sound normal, second sound accentuated with ill defined systolic whiff; area of dullness normal, systolic pressure 155, diastolic 108, pulse 70 compressible, small, regular. Abdomen negative. Patellar reflex very slight, some disturbance of sensation below the knees with areas of anesthesia.

Two days later, September 10th, patient felt very weak with increased pain, so marked that she could not bear the pressure of her hands on her head, nausea, vomiting and very marked diz-

ziness. Pulse 50, large and soft. Treatment consisted of elimination by the bowels. Analgesics had no effect on the pain for five days.

On September 22nd, I first saw her. Right eye vision 20/15? and with +4.00 Type 1. Pupil 3.5 mm. regular, active to light and accommodation. No conjunctival or bulbar congestion. Disk clearly outlined, no fundus lesion.

Left eye vision 20/20? and with +4.00 Type 1. Pupil 3.5 mm. regular, active. The same as the right in detail.

Refraction: R. +1.00 = 20/15; L. +1.25 = 20/15; 6 degrees of hyperphoria.

On September 26th, was ordered R + 1.00 \subset 1 degree prism base up 20/15 + 3.00 Type 1.

L. + 1.25 \subset 1 degree prism base down 20/15 + 3.00 Type 1.

All annoyance disappeared by wearing the glasses.

On November 20th, she complained of double vision which had been present for from seven to ten days, a red spot to the outer side of the right eye and a sense of orbital tightness.

Right eye vision 20/40, although the same correcting lens gave 20/15. Limited external motion of the globe, eye turned in 15 degrees with paresis of the external rectus. The bulbar conjunctiva injected, with superficial vessels standing out as an encircling zone about the cornea and extending over the entire globe into the cul-de-sac. The lower part of the orbit was full, the upper, however, was normal. By the Hertel exophthalmometer, the eye was found proptosed 15 mm. the left 10.5 mm. Pupil 3.5 mm. regular, active to light and accommodation. Media clear. Disc and retina show large veins and arteries, with faint congestion. No in-

distinctness of nerve outline. Definite pulsation of the eyeball with distinct bruit over the globe extending to the right temporal region. The patient was told of the condition and advised operation. While waiting, she was kept in bed and given potassium iodide.

On December 3rd, 1914, the eye was much worse. Exophthalmometer, protrusion 22 mm. Marked chemosis of the lower half of the eyeball with intense congestion of the entire conjunctiva. Complete right sixth nerve paralysis, as well as partial third nerve involvement. Pupil 4 mm. regular, reacting slowly, disk edges blurry, vessel changes more marked, veins and arteries fuller, retinal congestion definite.

Under ether, Dr. A. W. Elting exposed the common, external and internal carotids, on the right side. The right eye was kept under constant observation with an electric ophthalmoscope; first to notice the effect when the common carotid was compressed, and second the result when the internal carotid was occluded. As both stopped pulsation of globe and fundus vessels, the internal carotid was ligated in two places with silk. The immediate result was the blanching of the fundus and a 5 mm. reduction in the proptosis, being with the exophthalmometer 17 mm.

The next day, December 4th, 1914, exophthalmometer 21 mm. with marked globe pulsation, edema of lids and conjunctiva and nerve head.

Three days after the operation, pupil was 5 mm. immobile. Patient was semicomatose with partial leftsided hemiplegia which, however, cleared later in the day. At this time, the patient was in a very critical condition, presenting evidence of considerable brain edema. On the tenth day following operation, the proptosis reached its greatest intensity, 23 mm., the disk edges were blurry but not edematous, and the globe pulsation marked. From the minute of operation, the eyelids

were strapped for protection of the cornea, the exophthalmos, being so great that a keratitis was imminent especially as there was complete loss of globe motion and corneal sensation.

On the seventeenth day, the patient left the hospital. Exophthalmometer 22 mm., pupil 7 mm.

Twenty-six days after the operation, all pulsation of the globe disappeared and with it the bruit. Neither bruit nor pulsation has been present since. On the thirtieth day, motion began to return in the vertical direction. By exophthalmometer 19 mm. of proptosis. On the forty-fourth day, the globe protruded 17 mm. with free motion except outward, the sixth nerve remaining paralyzed. Pupil 6.5 mm., disk clearly outlined with beginning atrophy. On the fifty-first day, the eye was freely movable in all directions, bulging 15 mm. Complete optic atrophy.

Ninety-sixth day after operation the right pupil was 7 mm. immobile. In the macular region there is an irregular area of absorbed pigment, thruout the fundus a very marked narrowing of all the blood vessels. Proptosis 12 mm.

The left eye has remained as first noticed.

Some may wonder why the eyelids were not stitched together to protect the cornea. But had that procedure been followed, it would not have been possible to record the exophthalmos progress or retrogression, or to have detailed the fundus findings.

This case presents many points of interest, chief among which is the early diagnosis, for as far as I am able to find, no other reporter speaks of so prompt a recognition of the first eye symptoms; the excellent operative recovery following the very alarming circulatory symptoms on the third day after the operation. The complete recovery of eyeball motion and the preservation of the cornea are other noteworthy details.

STAR SHAPED FIGURE IN THE MACULA OF SYPHILITIC ORIGIN.

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The report of a case observed clinically to complete recovery, with illustrations.

The ophthalmoscopic picture known as the star shaped figure in the macula is so frequently associated with the degenerative changes in the retina accompanying Bright's disease, that its presence is almost pathognomonic. Similar changes are said to occur with

sun or star with all its rays complete, should occur in an otherwise healthy person, and under the influence of treatment disappear leaving an apparently normal macula is unusual.

The following is a report of the case: Miss R., aged 25 years, consulted

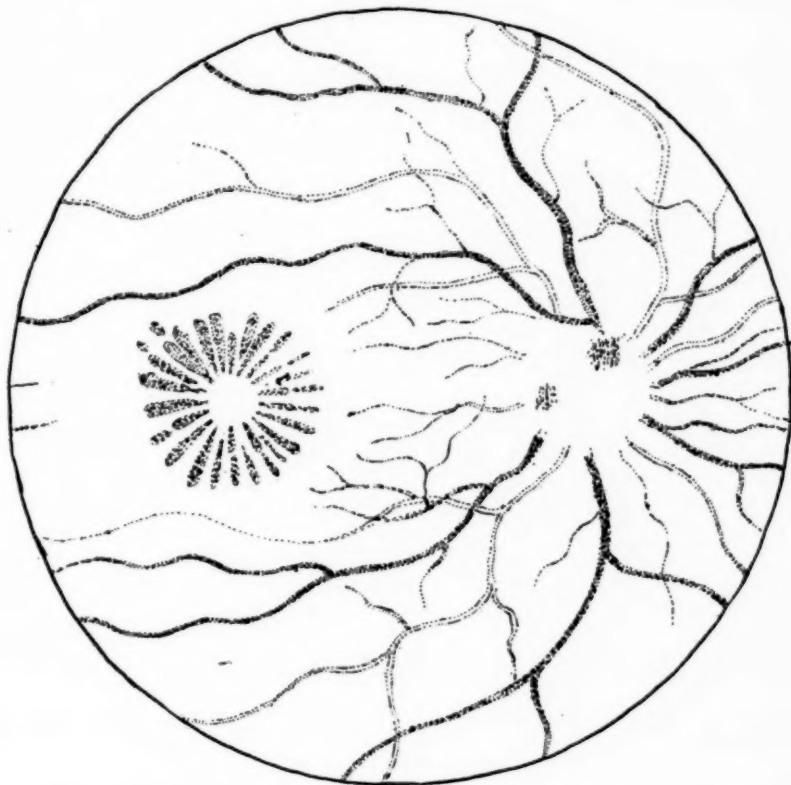


FIG. 1.
Star Shaped Figure in Macula of Right Eye. Optic
Disc Hidden by Exudate. (Haden).

choked disk or neuro-retinitis the result of cerebral and cerebellar tumors, and some few instances of more or less atypical appearance have been reported of uncertain origin.

That the same macular appearance, only slightly idealized into a perfect

me at my office Feb. 3, 1912. She stated that for the previous week she had had difficulty in seeing with the right eye, but that otherwise she felt perfectly well. She did not have headache or pain in any part of her body and was attending to her duties as school

teacher. Her general appearance was that of sturdy, stolid German, of the peasant class. Her parents were German farmers located in Texas. She was born in this country. Her family history was negative and her personal history presented nothing unusual.

Examination of the eyes:

O. D. V. = 2/60.

O. S. -1.00 S = 6/6.

somewhat circular arrangement. They were very white and had but little light reflex. O. S. The media and fundus presented no abnormal changes. The examination of the urine was ordered and made the following day. No albumin, sugar or casts were found.

When she returned two days later (Feb. 5, 1912) the vision of the right eye was 1/60. The ophthalmoscopic

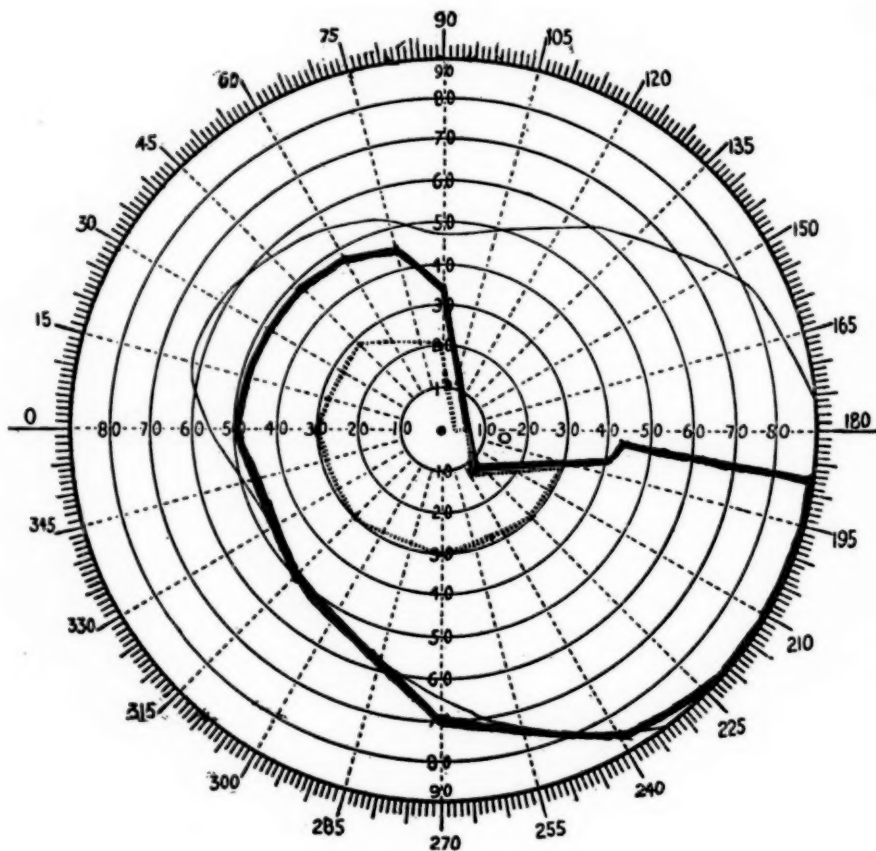


FIG. 2.

Field of vision at early stage of the disease. Loss of upper, temporal field. Solid line boundary of field for form. Dotted line boundary of field for red.

The ophthalmoscope revealed a slightly swollen disk which was fluffy and white in its nasal half. The veins near the disk were a little tortuous but not perceptibly enlarged and the arteries were unchanged. In the periphery of the macular region there were numerous oblong white spots in a

appearances had materially changed. The macular area was now occupied by a complete star, or more correctly described, sun shaped figure of startling brilliancy. It gave one the impression of looking into the depths of a white flower. The rays with few exceptions were equal, being approxi-

mately $\frac{3}{4}$ disk's diameter long. They commenced around a circular area of dull red color $\frac{1}{4}$ of a ray's length in diameter, whose depressed center was the fovea centralis. On the disk, in its upper and lower part, two splotched hemorrhages had appeared.

The visual field of the right eye showed loss of the superior temporal

fear of exciting suspicions in her family. Inunctions of mercurial ointment, one-half drachm daily, and potassium iodid, gr. 10 three times daily, and increased gr. 1 per dose, were prescribed.

Feb. 12, 1912, the macular figure had faded a great deal, especially down and in, where in some parts it had entirely disappeared. The foveal cup was not

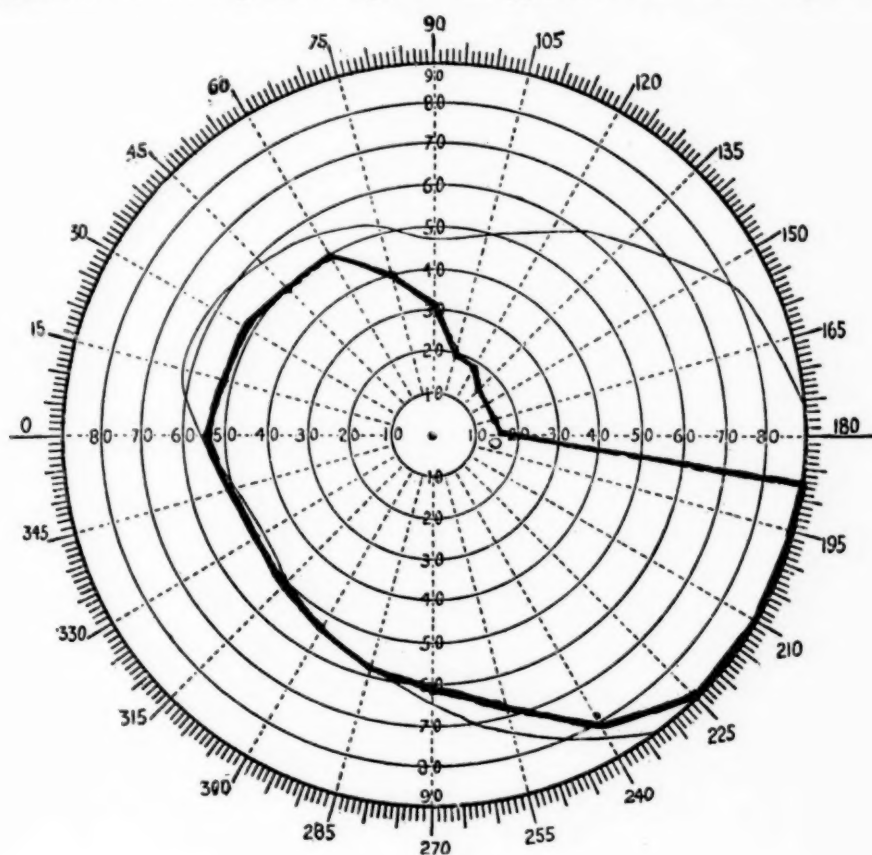


FIG. 3.

Field of vision after twenty-eight months, showing permanent defect of field for form.

quadrant, and some contraction in the superior nasal portion for form and colors. Fixation was not involved and there were no scotomata. The fields of the left eye were normal.

A thorough physical examination, including the nose, throat and ears was made but nothing abnormal was found. The reflexes and station were normal. A Wassermann test was not made for

so deep and the macular area was flatter. The disk was more obscured. It had become an ill-defined mass in which the vessels were only occasionally seen. It was slightly elevated and feathered off into the surrounding fundus. The vision was $\frac{1}{60}$. The inunctions were increased to one drachm daily, and the iodid increased.

Feb. 26, 1912, the macular figure was

absent on the nasal side, but still well defined on the temporal side. The vision had increased and was 5/60.

March 22, 1912, the macular figure had disappeared, except four or five spots on the temporal side. The temporal margin of the disc was well defined but the nasal side, especially the lower quadrant, was swollen, white and feathery. At this date she was taking potassium iodid gr. 100 three times daily. The mercurial inunctions had been discontinued for one week. The vision of the right eye with -1.25 Sph. was 6/20. The K. I. was continued.

When seen June 1, 1912, the macula was free of spots. The disk was atrophic on the nasal side, being especially white in the lower nasal quadrant. The lamina cribosa were not seen. The fields were practically the same as when first measured.

The vision of the right eye with -0.75 Sph. was 6/6, and 0.50 meter type was read at 18 cm. The urine had been examined frequently, but at no time were albumin, sugar or casts present. The specific gravity ranged from 1015 to 1030.

June 11, 1914, two years later, the vision was normal and the ophthalmoscopic appearances and fields were the same as when last recorded in June 1, 1912.

I believe that the lesion that produced the macular figure was an exudate in and swelling of Henle's outer fibre layer of the retina, secondary to a local inflammation in the optic nerve near to and involving the papilla. The cause of these lesions may only be surmised but in view of her tolerance to mercury and iodid, and the rapid improvement during their use there is a strong probability that it was syphilis.

A PATHOGENIC BACILLUS SUBTILIS ISOLATED FROM THE EYE.

E. A. GREENSPON, M. D.

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A bacteriologic study based upon two cases of panophthalmitis following cataract operation, made in the Department of Bacteriology of McGill University and the Royal Victoria Hospital, Montreal. Read before the Canadian Medical Association, June 15th, 1917.

The bacillus subtilis was found several times by Silberschmidt as the causative agent of panophthalmitis in man. He was able, by inoculation of rabbits, to reproduce the disease. Kayser¹ also described two cases of panophthalmitis in which bacillus subtilis was demonstrated as the causative organism. A purulent conjunctivitis has been described by Michalski² as the result of infection by an organism closely related to the hay-bacillus, but differing from it by the acidification of milk, the production of a brown pellicle on broth and of brown colonies on agar as with *B. Mesentericus Vulgatus*. The author designated this organism as *bacillus conjunctivitis subtiliformis*. Very closely related to bacillus

subtilis is the *B. Peptonificans*,³ the cause of epidemics of gastro-enteritis. The colonies on gelatine present a crown of fine rays.

The present communication deals with the investigation of two cases of panophthalmitis, in which an organism identified as bacillus subtilis was isolated, its source traced and its pathogenicity demonstrated. The infections followed operations for cataract. The bacteriology of the conjunctival sac was determined, and in each case there was found a staphylococcus albus, non-hemolytic and non-proteolytic, and a diphtheroid bacillus with the fermentative reactions of bacillus xerosis. In each case twenty-four hours after operation there was set up a tremendous

suppurative condition of the whole eye, and of the upper and lower eyelids. After five or six days this condition began gradually to subside and terminated in cicatrization of the eye, leaving the eye as a grey nodule half of its former size (phthisis bulbi).

The pus was examined in direct smears and transfers were made to Loeffler's blood serum. The organisms recovered from the pus were in pure culture, and corresponded in morphology and cultural and biochemical reactions to *bacillus subtilis*.

In an attempt to trace the source of the infection a bacteriologic examination was made of the saline that had been used for irrigation in the operations previously referred to. Five cubic centimeters of this saline were transferred by a sterile pipet, and under sterile precautions, to broth extract. After twenty-four hours' incubation there was growth of an organism identical in morphology and cultural characteristics with that found in the patients' eyes.

A bacteriologic examination was made at the same time of the rubber tubing and glass funnel which had formed the irrigation apparatus. Normal saline, twice autoclaved and proved perfectly sterile, was passed through the funnel and through the rubber tubing and the washings were delivered into flasks of extract broth. After twenty-four hours' incubation, an organism was recovered identical with that from the patients' eyes and with that from the saline used for irrigation. The conclusion, therefore, was that the transmission of the infection took place from the saline that had been used to irrigate the eye.

The experiments for the determination of pathogenicity were performed on rabbits. A twenty-four hours' broth culture of the *bacillus subtilis* was employed. A few drops of the culture were introduced into the anterior chamber of the eye by the following method; the conjunctiva was incised at the limbus by a keratome, and aqueous allowed to escape. By means of a sterilized hypodermic syringe a few drops of the culture were then intro-

duced into the anterior chamber, without producing any increased tension. In twenty-four hours there followed tremendous suppuration of the eye, and edema of the eyelids. The animal was very sick. The condition began to subside in a few days, and in two weeks there was cicatrization with the formation of a hard nodule.

The other rabbits were injected with the same culture, the one subcutaneously, the other intravenously. No abscess was formed in the animal which had been injected subcutaneously; the other animal which had had as large an amount as 5 cc. of the culture introduced into the blood stream showed no ill effects, other than a short period of malaise; and the animal developed no eye lesion.

Other experiments were performed with the object of comparing the effects of other races of *bacillus subtilis*. One of these races, when introduced into the anterior chamber of the eye, produced no untoward effects beyond a slight opacity at the site of inoculation. This experiment was not considered parallel, however, because the age of this organism was not known. Another experiment was therefore performed, using a strain freshly isolated from hay-infusion by heating the infusion (prepared by steeping hay in sterile distilled water over night) at 80° C. for one hour and subsequently plating on plain agar. This organism also was incapable of producing any pathogenic effect when introduced into the anterior chamber of the eye. On the other hand, the original pathogenic *bacillus subtilis* was capable, after eight generations, of producing a panophthalmitis as severe as that produced by the organism when freshly isolated.

A twenty-four-hour broth culture of the pathogenic *bacillus subtilis* was subjected to filtration through a Berkefeld filter, and the resulting filtrate was introduced into the anterior chamber of the eye of a rabbit. No pathogenic effects were observed.

It would seem, then, that this pathogenic *bacillus subtilis* is elective for the eye. This pathogenic property is an

attribute only of certain races of the organism. Stregulina⁴ thinks that those races of *Bacillus subtilis* which come from the soil can be pathogenic. Of twenty-five samples that he inoculated into guinea pigs, sixteen were pathogenic and three of these produced panophthalmitis. On the other hand, such factors as repeated animal passage and cultivation on media containing blood, which have long been known to enhance pathogenicity may play a part in

some indirect way. Indeed a pathogenic *Bacillus subtilis* has been obtained by Charrin and De Nittis⁵ by repeated animal passage and cultivation on blood-media. But they found that at least three-quarters of their most pathogenic culture obtained in this way was required in order to kill a guinea pig.

I wish here to thank my chief, Dr. A. A. Bruere, for helpful suggestions.

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OPHTHALMIC EXAMINATION OF DRAFTED MEN AT CAMP JACKSON.

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Ophthalmologist's report covering September to December, 1917. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, February 21st, 1918.

Up to the middle of December, 1917, the men, white and black, in the first selective draft of the new National Army received at the cantonment at Camp Jackson, Columbia, S. C., were drawn directly from the Carolinas and Florida, but in the later weeks of the period additional men hailing largely from Tennessee and Arkansas, entered by transfer from Camps Pike and Gordon.

As viewed by a stranger from the North, these men presented physical and social characteristics not commonly seen in the ordinary experiences of his practice in an eastern city. Except for the Floridians it might be said that all were descended from families which had been in America for many generations. The white Carolinians were, in the main, above the average

height, the majority having long heads, fair complexions; their skins being thin and of delicate texture and their irides blue or gray—characteristics betokening British ancestry, which ancestry was further indicated by their family and given names. The Tennesseans were not so tall, their facial lines smaller and their complexions swarthy. The Floridians were of mixed types; their names as well as their physical characteristics indicated descent from more recent European emigrant ancestry, while a number were natives of Cuba and of other of the Spanish West Indies.

The negroes were quite African, scarcely any were mulatto. They came from all sections of the states named. They appeared to be members of distinct groups as they could be distinguished by their facial and general physical linea-

ments, and were further separated by their variations in speech. They were of pure unmixed tribes, apparently, and one fancied that he could tell which were Zulu, which Kaffir, which Hottentot, and which from the Guinea Coast; and, to one conversant with these variations among them it was possible to tell from exactly which county of this state an individual came. A negro from Charleston or the sea coast was readily differentiated from the negroes of the highlands of North and South Carolina. There was a sprinkling of Cherokee and other Indian tribes, long resident in Florida and the Carolinas.

In this present consideration it must be borne in mind that the men sent to the camps by the draft boards were presumed to be in perfect health and quite fit to serve as soldiers; and, that the majority of them did not arrive until several weeks subsequent to their local board examinations. Immediately after arrival at Camp Jackson they were subjected to a rigid examination by the regimental surgeons, before they could be assigned to the various organizations apportioned to the cantonment. When the surgeons were in doubt as to their physical fitness they were referred to a Central Board of Examiners, composed of the chiefs assigned to the several departments of the base hospital, viz., surgery, medicine, including heart, blood vessels and lungs, psychoneurology, venereal disease, otolaryngology and ophthalmology.

It, doubtless, will be of interest to be told of the ophthalmologic affections which were deemed of sufficient gravity to disqualify for the service, according to the regulations prepared by the Surgeon General of the army, and prescribed by the President of the United States, to wit: "The minimum visual requirements to be as follows: 20/40 for the better eye, and 20/100 for the poorer eye, provided that no organic disease exists in either eye." And further: "The following defects are causes for rejection: Acuity of vision below the requirements of the preceding paragraph; conjunctival affections, including trachoma and entropion; strabismus, diseases of the lachrymal apparatus, exophthalmos, ptosis, asthenopia, nystagmus." These require-

ments have been greatly modified and will not hold in the future selection of draft men.

Here is a summary of the cases rejected by my board:

DISEASES OF THE LIDS AND EYEBROWS: Marginal blepharitis, 2; chalazion, 1; traumatic coloboma, 1; dermoid cyst of the orbital ridge, 1; dermatitis venenata, 1; distichiasis, 1; ectropion after abscess, 2; ptosis, 1; symblepharon, 1; sycosis tarsi, 1.

LACRIMAL APPARATUS: Dacryocystitis, catarrhal, 1; after fracture, 1; lacerated wound involving the sac, 1.

CONJUNCTIVA: Catarrh, acute, 2; chronic, 8; conjunctivitis, "granular," but not trachomatous, 3; distinctly trachomatous, 35; gonorrheal, 1; gunpowder pigmentation, 1; pterygium, unilateral, 2; bilateral, 9; recurrence after removal by previous operation, 1. The eyelids of every man examined were turned to expose the retrotarsal folds—the most efficient instrument for the purpose I found to be the corner of the desk blotter, which could be applied to the full length of the tarsus. Later I whittled a stick like a golf stick.

The cases of acute conjunctivitis rejected were marked by symptoms amounting to blennorrhoea.

It was not possible for me to ascertain the number of cases of trachomatous disease rejected by the regimental examining surgeons, but the comparatively small number found by the Central Board quite surprised me, as a greater number had been anticipated. The cases seen by us exhibited only moderate signs, not at all so severe as we might have seen at any day's clinic in the northern cities. Few showed cicatrices, however, but all rejected presented roughening of the upper tarsus, with granulation of the free borders and retrotarsal folds. Only two negroes, who were very black and of short stature, had trachoma.

A comparatively large number of cases of specific urethritis arrived at the cantonment, yet only one case of gonorrheal conjunctivitis was referred to me, and he was a negro. The anterior segment of his globe was already destroyed, with the uvea bulging through the corneal perforations, on his arrival.

In my previous experience I had not seen pterygium in young subjects, yet at these Central Board meetings eleven men were disqualified because the wings extended so far over the corneas as to interfere with sight. One man had bilateral growths, one of which being a recurrence at the site of a mass which had been removed five years previously.

CORNEA: Nodular degeneration, 2; keratitis, dendritic, 1; herpetic, 2; interstitial, 1; ulceration, 1; vascular pannus, 1; keratoconus 1; leukoma, believed to be malarious, 1; maculation, 7; gunpowder pigmentation, 1. Staphyloma, 1; accompanying gonorrheal ophthalmia, 1; results of penetrating wounds, 3.

The cases of nodular degeneration of the cornea were bilateral. In one case the spots were at the centers; in the other they were in the outer zones, yet in each case the peripheries were clear.

It was interesting to have recorded only one case of interstitial keratitis and but a single case of pannus. The end-results of wounds of the cornea showed cicatrices through the limbus with more or less involvement of deeper tissues.

The case presumed to have been malarial keratitis occurred in a man who had had several attacks of malaria in an aggravated form, he stated, in each of which his eyes became inflamed. His last seizure had been within the twelve-month. The inflammation had lasted several weeks; since the subsidence he had noticed that his sight had become imperfect. There was a localized opacity in the parenchyma.

The case of staphyloma was at the upper limbus and had supervened after repeated attacks of inflammation of the anterior segment. It protruded prominently when the lid was raised.

IRIS AND CILIARY BODY: Foreign body in anterior chamber, see glaucoma; ciliary staphyloma, 1; coloboma, 2; corectopia, 1; exclusion of pupil by annular synechia, 1; iritis, recurrent, 1; ectropion, 1; paralysis of spincter pupillae, 1; posterior synechia, 2; results of lacerated wound, 1. The coloboma of the iris included the sphincter and extended completely into the ciliary body.

AFFECTIONS OF EYEBALL: Exophthalmos, 2; glaucoma, secondary to wounds,

with the presence of foreign body in the anterior chamber, 1.

The etiology of the two cases of exophthalmos was not ascertainable; they were not goitrous. In consultations with my colleagues I examined a score of cases, perhaps, of Graves' disease with exophthalmos.

MUSCLES AND NERVES: Nystagmus, horizontal constant, 3; "intermittent," 2. Paralysis: External rectus, 1; inferior oblique, 1; superior rectus, 1; strabismus, convergent, 34; divergent, 11.

The "intermittent" nystagmus exhibited features the like of which I do not recall having seen hitherto. In each case the eyes were quite normal until after slightly prolonged efforts at convergence-fixation, when with almost startling rapidity the eyes oscillated from left to right in the chord between the vertical meridian and the extreme right. The movements continued for a few seconds and then after a moments' rest if further efforts at convergence were attempted a similar explosion would follow. I did not consider these to be cases of true nystagmus, but rather that they were due to inherent weakness. Neither man presented signs of generalized nervous disease.

CRYSTALLINE LENS: Cataract: Cortical, immature, 1, mature, 2; anterior polar, 3; disciformis, 1; post-traumatic, 5; opacity, 1; results of punctured wound, 1.

Of those showing disorder in the crystalline lens two were cases of mature monocular cataract, in appearance like senile cataract; in each case the fundus of the fellow eye appeared perfectly healthy. The disciform cataract was of the type such as that which I reported some years ago as having found in several members of a family, the opacity being situated behind the nucleus in advance of the posterior pole.

CHOROID: Albinism, 1; simple generalized atrophy, 6; traumatic atrophy, 1; in relation to myopia, 1; chorioretinitis, 1; associated with acne, 1; choroiditis disseminata, 1; coloboma, 1; rupture, 4. The coloboma occupied the lower median fifth, extending up to the edge of the disc. The ruptures were all of the

usual form in the temporal half of the fundus.

RETINA AND OPTIC NERVE: Retinal atrophy, 2; after injury, 1; optic atrophy, said to be congenital, probably hereditary, 3; postneuritic, 2; papilledema, accompanying hemiplegia, 1; retinitis proliferans, 3.

ANOMALIES OF REFRACTION AND ACCOMMODATIONS: Amblyopia ex anopsia, 5; anisometropia, 1; hypermetropia, 19; myopia, 13; paralysis of accommodation by use of cycloplegics, 1.

Of the nineteen cases of hypermetropia and thirteen myopia rejected, several, who had claimed that they were blind, expressed delight when a manifest correction gave them useful sight.

MALINGERING: No statistical and analytical records were kept of those who feigned blindness. As already stated, the men had been drawn largely from the country and mountainous districts of the Carolinas and of Florida. There were, also, laborers from the towns of that state. Many received from Tennessee, Kentucky, Arkansas and Mississippi were from districts remote from the large cities. The blacks came chiefly from the Carolinas.

It was not always easy to ascertain the acuteness of the men's sight, for many could neither read nor write, and not a few did not understand the numeral characters. It should be remembered that the men of greater degrees of education had already enlisted in the National Guard. Many magnified their visual or ocular complaints, yet their efforts at malingering were manifested most crudely. With some it became evident that they had been coached, because I noticed that they would readily read to, say, 20/70, with the right eye, and 20/100 or 20/200, with the left, yet, while off their guard, when the order of examination was reversed, would read better with the claimed-to-be-poor eye and worse with the hitherto good eye. Others lost control of themselves by their interest in pointing the direction in which the arms of the "illiterate—E" were placed while others were detected by their ability to count the strokes of those of the 20/15 line; and others perceived short 1-inch lines which they counted at full

20/20. Quite a number deliberately closed their eyes, declaring they could not see; others feigned complete blindness, yet they admitted that they had for years followed gainful handicrafts and that they had found their way unaided from their barracks, to which they had been introduced in the middle of the night previous. Others, whose manifested standards were below requirements, evinced the greatest interest in the records while they were being made, and, several were detected reading the cards with the greatest ease.

Among the inflammatory states seen were several cases which I assumed to have been self-inflicted, as, for instance, by the placing of gritty substances beneath the eyelids. Such inflammations were always monocular and the physical signs localized. One individual had complete long continued mydriasis with cycloplegia artificially induced. No man tried to simulate blindness who had actual disease of his eyes or lids likely to destroy his sight.

Every man referred to me was given a dark room examination. A common complaint by those whose visual acuteness was under question was that the reflection from the ophthalmoscope was painful and blinded them. In the tests prisms, stereoscopes and colored glasses were used. My methods of procedure sought to analyze the history of each man's sight, and, in addition to the inspection of his eyes, a survey of the general health in needful cases was made.

My service on the board became a delightful experience, the members cooperated with ever-ready helpfulness, and, while every effort was made to accomplish the day's quota with dispatch, time was taken to study each man's case from every point of view for the proper rejection of ineligible men.

I here wish to pay tribute to my colleagues. All had been called from active practice and in the day's round they gave of their best. Our service on the "Central Board" fitted us for a still closer association in the wards of the base hospital when it was opened for the reception of the sick. Of my experiences in the hospital I trust to be allowed to speak at another time.

WASSERMANN FINDINGS IN OPHTHALMIC DISEASE.

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Report regarding five hundred cases studied in the Pathologic Laboratory of Wills Eye Hospital, with remarks on methods employed and significance of results.

The following report is based upon the study of 500 Wassermann reactions of patients suffering from eye conditions, to determine whether syphilis was an etiologic factor and so aid in diagnosis and future treatment. These tests were made by the method of Wassermann. There were two antigens used: an alcoholic extract of syphilitic liver and a cholesterinized alcoholic extract of beef heart. In syphilis the reaction does not become positive, as a rule, until about the seventh or eighth week after the appearance of the initial lesion, or chancre, although a positive Wassermann has been reported in five days after the appearance of the initial lesion. (Laird.) This fact is interesting to ophthalmologists in cases of suspected chancre of the eyelid, and we have to rely upon the clinical symptoms until the appearance of the secondary lesions, or until by repeated tests a positive reaction is obtained. A quick diagnosis can often be made by expressing from the lesion some serum and examining under the microscope with the dark field illuminator, showing the *Spirocheta Pallida*, silvery white in a dark field.

In the secondary form, the diagnosis is made from the clinical findings, and a Wassermann is done only as a confirmatory measure. A negative in this case is considered as almost a certainty that the disease is absent. An example of the secondary form is that of syphilitic iritis in the form of nodules. This was formerly called gumma of the iris, but, as pointed out by Widder, is now considered as an iritis papulosa or condyloma. This is an inflammatory condition of the anterior segment of the eye. Chronic affections are more dis-

tinctive of disease of the posterior segment.

Syphilitic eye conditions may be congenital or acquired. In the tertiary forms of untreated syphilis, about 96 per cent are positive. Boas reports 435 cases in which treatment had been given, in which 80 per cent gave negative reactions. A positive reaction means syphilis, whether acquired or congenital. A negative reaction is not proof positive that syphilis does not exist, and future tests should be made if syphilis is suspected. A positive Wassermann may often be obtained from the test of the cerebro-spinal fluid, although the blood serum shows a negative result.

Citron originally observed that during mercurial treatment the Wassermann gradually becomes weaker and finally disappears. A negative reaction after treatment does not say that a cure is effected and the patient is free from spirochetes. Frequent Wassermann's should be made for a period of at least two years and occasionally during life.

In cases of latent syphilis, or cases strongly suspected of being syphilitic, where a negative reaction is obtained, antisyphilitic treatment in the form of mercury or salvarsan may be given. By the provocative stimulation of the spirochetes by drugs insufficient to kill them, one causes a positive reaction and thus shows a latent syphilis requiring further treatment.

The following cases were listed in the laboratory according to the diagnosis accompanying the specimen, and I am therefore unable to state the associated clinical conditions. No effort was made to classify the diseases.

	Number of cases.	Posi- tive.	Neg- ative.
Amblyopia (toxic)	1	1	0
Atrophy of optic nerve	74	30	44
Blepharospasm	1	0	1
Buphthalmus	1	0	1
Brain tumor	3	0	3
Cataract (incipient)	2	0	2
Ciliary ectasia	1	1	0
Choroiditis	26	9	17
Exudative	1	1	0
Disseminata	5	2	3
Macular	2	0	2
Cycloplegia	2	2	0
Corneal opacities	1	0	1
Conjunctivitis purulent	2	0	2
Convergent squint	1	1	0
Choked disk	7	1	6
Cornea (leucoma)	1	0	1
Dacryocystitis	1	1	0
Descemetitis	3	0	3
Diplopia	5	1	4
Enlarged lacrimal gland	1	1	0
Episcleritis	1	0	1
Irido-cyclitis	9	4	5
Iritis, plastic	46	21	25
Traumatic	2	0	2
Rheumatic	2	0	2
Papulosa	1	1	0
Gummosa	3	3	0
Kerato	10	4	6
Iritis with secondary glaucoma	1	1	0
Keratitis, sclerosing	3	2	1
Hypopyon	1	0	1
Ulcerative	7	3	4
Interstitial	107	66	41
Neuroparalytica	1	0	1
Punctata	5	0	5
Superficial punctata	2	0	2
Serpiginous ulcer of cor- nea	1	1	0
Glaucoma, secondary	3	0	3
Glaucoma, inflammatory	1	0	1
Gumma of orbit	1	0	1
Leucoma adherens	1	1	0
Leucoma with proptosis	1	1	0
Mikulicz's disease	2	2	0
Neuroretinitis	20	6	14
Optic neuritis	14	7	7
Ophthalmoplegia	3	0	3
Orbital growth	2	1	1
Perivasculitis	2	0	2
Paralysis, third nerve	1	1	0
Paralysis, external rectus	17	7	10
Ptosis	20	5	15
Retina detached	2	2	0
Retinitis—			
Chronic	7	0	7
Circinata	1	0	1
Hyperplastica	1	0	1
Pigmentosa	1	0	1
Chorio	7	2	5
Retrobulbar neuritis	2	0	2
Scleritis	1	1	0
Supraorbital abscess	1	0	1
Tarsitis	1	1	0
Uveitis	27	11	16
Vernal catarrh	1	0	1
Vitreous opacities	15	4	11
	500	209	291

It is not my intention to pass judgment upon the question whether, in the cases giving plus reactions, the eye conditions are always necessarily due to syphilis, or that the cases giving negative reactions might not at times be due to syphilis, but rather to show the results obtained by the study of all the cases presented through a large eye service.

For example, the case of toxic amblyopia: This condition may have been caused by methyl-alcohol, tobacco, or other toxic substance, and therefore does not necessarily indicate that this case was due to syphilis, because of the fact that there was a plus 4 Wassermann.

The records of the Wills' Hospital, which are open for examination, contain the complete clinical and pathologic records of the foregoing cases.

THE ASSOCIATION OF OCULAR AND NASAL ACCESSORY SINUS DISEASE.

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This is a general review of these associated lesions and diseases as described in the literature and encountered in practice. It was read in a symposium before the Section of Otology and Laryngology College of Physicians, Philadelphia. With bibliography.

It will be conceded readily that the careful study of the ocular symptomatology associated with or directly caused by disease of sinuses accessory to the nose, is the focal point to which converge two important specialties. To the ophthalmologist the early recognition of this association is always important, and his failure in it may be an exceedingly grave one. It has long been recognized that the etiology of the often complex symptomatology of this anatomic and clinical borderland may require for its elucidation the cooperation of the internist, the laboratory and X-ray experts, in association with the rhinologist and ophthalmic surgeon.

Some of the ophthalmologists present will recall the discussion precipitated some ten years ago by Dr. Posey in a paper before the American Ophthalmological Society upon the position of the ophthalmologist in the treatment of nasal sinus disease, the plea being made for a more accurate appreciation and study of the relationship obtaining between these ocular and nasal structures. In his discussion of Posey's paper, the late Dr. Gruening of distinguished, if somewhat bellicose memory, replied, "The ophthalmologists do pay attention to these conditions and the ophthalmologist must be a rhinologist that is understood and there can be no doubt about it."

The enormous development of each of our specialties during the last ten years may well make us question this dictum of Teutonic finality. It was Arthur Christopher Benson who said of the specialist that he was harmless and necessary, so long as he was aware of his limitations. The ophthalmolo-

gist who has the temerity to attempt an entrance into the field that you so preeminently command, if he has had sufficient training to make him conversant with these associated conditions, may intelligently examine and conservatively treat them; but must be prepared to ask the assistance, at the proper time, of his rhinologic confreres in the performance of the necessary operations upon the contiguous sinuses.

Let us try to disassociate our study from the stigma of undue magnification of the cause of the ocular symptomatology as necessarily resident in the sinuses, even though disease of both structures exists. In the development of this thought, it behooves us, likewise, to be constantly on guard to recognize the constitutional factors that may be inducing a toxemia of each of these contiguous structures at one and the same time, the proper treatment and removal of which may cause prompt amelioration and cure of the ocular and nasal conditions, without the need of other than the mildest local treatment.

The narrow viewpoint of the specialist was recently illustrated while discussing, with a distinguished professor of operative dentistry, the association of maxillary sinusitis with diseased teeth conditions. He, stoutly maintaining that every such case was due to the teeth, and I think accepted, with considerable qualification, the writer's definite statement that about 75 per cent of such conditions were entirely disassociated with any dental disease.

Since the subject of accessory sinus disease, from the rhinologic standpoint, was so admirably reviewed in a

recent symposium before the members of this section, participated in by such authorities as Skillern, Grayson, Vansant, Coates, Gleason, Wood, Eves, and others, it is my purpose to approach it in the main from the ocular viewpoint.

The rhinologist will unquestionably maintain that many cases of sinusitis are entirely minus any ocular signs, and, indeed, most of us will agree with so careful an observer as Jessop of London, when he suggests that, at times, there are no characteristic visual changes associating these two contiguous structures. Bryan of Washington believes that the majority of all the severe inflammations of the accessory sinuses are accompanied with more or less disturbance of the eyes, the variations being, as a rule, governed by the severity of the sinus disease; and that they are not discovered early because not adequately sought until ocular symptoms develop.

F. E. Brawley of Chicago, a painstaking observer and student of these associated conditions, maintained as early as 1907 that every case of intra-ocular disease should be accompanied by a careful study of these contiguous cavities. Even a partial review of the literature will make most of us willing to assume the advanced position recorded by the late lamented Reber, that all manner of extra- and intra-ocular disease is, at times, traceable to nonsuppurative and suppurative pathologic processes in these contiguous nasal sinuses, and will certainly justify the observation that in all ocular diseases of obscure origin the sinuses should be studied, and if ocular signs justify it, treatment of the suspected sinuses is indicated, even in spite of a negative rhinologic report.

It is a fact that the careful special testing of visual function, and the finding of certain changes in the visual field, may establish a diagnosis before nasal symptoms have been sufficiently marked to attract attention; and further, it is not infrequent for closed empyemas and mucocoeles to give a false sense of security by an almost total absence of nasal symptoms, notwithstanding the presence of ocular

change. It is quite impossible, in a comparatively brief consideration of the subject, to refer adequately to a very extensive literature which has accumulated during the last ten years, much of which may be classed as intensive and epoch making.

MANNER OF ASSOCIATION.

Onodi, as is perfectly well known, has given special impetus to the whole subject we are considering by his contributions, which include a study of the oculo-orbital, intracranial and cerebral complications, as well as by his published anatomic studies of the relations of the posterior sinuses to the normal and anomalous proximity to the optic nerve. The anatomic studies of H. W. Loeb² likewise furnished illuminating data regarding the relation of the posterior sinuses to the nerve and chiasm, this distinguished writer having advised us that more than half of the nerve was included in the sinus portion. The important relationship between the orbits and the sinuses, in the anterior segment of the skull, was the subject of an important communication by Dr. Samuel D. Risley,³ concerning abnormalities of ocular balance; it being even then recognized that departures from the normal contour in sinus development furnished a strong predisposing cause of interference with sinus drainage.

The strategic position occupied by these nasal sinuses with reference to orbital attack, by way of the roof-floor and inner wall, through the actual giving way of their thin, bony and mucoperiosteal partitions (and, indeed, in the case of the ethmoids, the existence of so-called dehiscences mark the absence of any but the latter protection), makes the direct extension by pressure, erosion and necrosis, or through the interstices, readily understood. Adhesions may occur between the orbital periosteum and the optic nerve sheath, and these adhesions may be vascularized, offering a direct route for ocular infection (Brawley).

It is quite unnecessary in this presence to trace the ophthalmic artery in its ramification from the orbit into the ethmoid and frontal cells, nor the re-

turn journey of the ethmoidal veins into their ophthalmic reservoir. Again, the intimate association of the ciliary system need scarcely be urged as pointing to the ease with which a toxemia may reach the eyes. With the role played by the fifth cranial nerve in ophthalmic, sinus and intracranial disease, you are also entirely conversant. The role of the lymphatics and the lymphatic sheaths of the nerves should be given emphasis in tracing the likely routes of infection. Regarding the latter method of transfer, it is claimed by Miodowski, as the result of his work in the clinic of Professor Briegar of Breslau (quoted by Freudenthal), that, by reason of their anatomic features, they should be and, he believes, are the best reservoirs of all invading bacteria.

It would be very desirable, if it were possible, to separate the ocular symptoms induced by sinus disease into two definite groupings, the anterior and posterior. The anatomic association, already referred to, as well as the numerous clinical reports at our service, will serve to indicate the impossibility of any such dogmatic differentiation. The routes of ocular involvement, secondary to rhinogenous disease, will be then—

- 1—By continuity.
- 2—By way of the blood vessels.
- 3—By way of the lymphatics.
- 4—By way of the lymphatic sheaths of the nerves.

OCULAR SYMPTOMS, the result of abnormalities in the nasal mucosa, have long been an established fact, entirely apart from the presence of pus producing organisms. Differences in the power of accommodation in the two eyes have frequently been relieved as recorded by such authorities as Ballenger, Stucky, Pyncheon and others, by the removal of nasal pressure in a partial excision of a hypertrophied middle turbinal. The disappearance of blepharospasm by the same procedure is a likewise generally recognized observation. Lacrimal disease from epiphora to blennorrhoea may easily be associated with mechanical obstruction of the

nasal end of the duct. Indeed, the vicious role played by the duct, in the transfer of infection to the cornea, is a generally conceded possibility. S. Lewis Ziegler claims that upwards of 90 per cent of corneal ulcers are due to nasal conditions.

Blepharospasm, dacryocystitis, photophobia, epiphora, ocular pain and reflex ocular disturbance, expressing itself in so-called asthenopia, have many times found a causative factor in nasal congestion, spurs, tumors, ulceration, hypertrophied or polypoid-turbinal degeneration; and from contraction of nasal synechiae caused by the too vigorous use of the cautery. H. C. Parker, in a review of these associated conditions, believes 50 per cent of them are caused by nasal disease. Ziem and Kuhnt have traced iritis and cyclitis to a nasal origin. Parker has found improvement in refractive defects to follow the lessening of ciliary irritation and congestion by nasal treatment; and few oculists today attempt to treat phlyctenular disease of the conjunctiva or cornea, without taking into account the condition of the nose, the tonsils and the adenoids.

Stauffer of Salt Lake City has noted deep ciliary injection to be present in nearly all high deflections, with pressure on the middle turbinal. A number of writers, among them Griffin and Haskell, have recorded observations pointing to the vascular or reflex connection between nasal hypertrophies and glaucoma, the latter disease being greatly relieved by the removal of the thickened vascular structure. Middle turbinal pressure may be either against the septum or antral wall, and a number of well known authorities insist that if pressure prevents free ventilation and drainage, the turbinal should be removed, even though it presents no pathologic changes, as the negative pressure, thus induced within the ethmoid or frontal, will eventually lead to pain, pus formation and ocular disturbance.

If the conditions briefly outlined are productive of evident ocular symptoms, it is surely not a far cry to the more

profound lesions that may easily accompany the deeper sinus congestions, mucocoeles or empyemas. The sinus involvement may run the gamut from a simple hyperemia to catarrhal inflammation, suppuration and necrosis, and each form may be, and frequently is, accompanied by ocular symptoms.

Perhaps the simplest form of ocular discomfort which is apt to succeed a congestion of the nasal mucosa, with obstruction of the normal sinus outlets, as pointed out by Parsons,⁴ is a unilateral headache, with pain and some tenderness at the upper, inner orbital angle, aggravated by stooping; with or without some vertiginous sensation, congestion of the conjunctiva of lid and eye-ball with lacrimation, muscular twitchings and discomfort upon attempting to use the eyes for near work. The latter symptom will probably draw attention to a refractive defect, which in itself may be an entirely minor element in the causation of the condition.

The vicious circle thus set into action, with the induction of so-called negative pressure within the sinuses, is a common observation. Middle turbinal pressure against the septum may be the contributive cause, and recurrences may make it necessary to excise it in part. As a rule, the acute cases of sinus disease are not seen by the ophthalmic surgeon, as the family physician and nasal specialist are those consulted during the earlier manifestations, and unless the infection is an especially virulent one, causing external violent ocular symptoms, the opportunity to examine such expressions of disease is only afforded well on in the subacute or chronic stages.

The usual types of eye involvement in acute and chronic sinus disease are those with external manifestations, edema, cellulitis, abscess; those without external signs, but manifesting definite lesions of the ocular fundus; those with corneal, iritic, ciliary or general uveal inflammation, and even glaucoma; those exhibiting the pressure signs of mucocoeles and finally the unilateral pain and headache due to rarefaction of air in frontal or ethmoid,

often expressing itself as violent asthenopia with or without definite pupillary, paretic or paralytic muscle phenomena.

SYMPTOMS.

The ocular symptom of sinus disease, to which I will first direct your attention, is *edema of the eyelids*, on one or both sides, usually unilateral. Gerber claims it to be a very early symptom of orbital involvement. It may be present for prolonged periods, at times being typically fugitive and recurrent, varying from a slight flushing to a marked swelling of red or brawny type. Dr. deSchweinitz⁵ in 1910 emphasized these fugacious appearances as pointing just as definitely to sinus disease as the common edema more generally present. They are usually accompanied with unilateral pain, supraorbital neuralgia, and frequently with burning on the affected side of the face, and can be an expression of disease in any one of the four sinuses, but are thought to be conspicuously evident in acute ethmoiditis and frontal sinuitis. Edema tends to lessen as drainage is established, and if due to either of the latter sinuses is apt to be less in evidence at night and more in the morning. There is no doubt, however, that even a casual review of the literature will definitely place the maxillary sinus in the role of causation. Onodi, di Giuseppi, di Tito, Rollet, Genet, Freeman of this city and others have reported cases. In Freeman's case it was caused by only a few drops of pus in the sinus. If due to disease of the maxillary antrum the edema should be more marked during the day, if the patient is in an upright position.

This symptom must be distinguished from that caused by incipient hordeolum as well as from the edema of an acute dacryocystitis, that from lid furuncle, or from the deep infiltration that precedes an abscess of the lids. The edema, accompanying periostitis of the orbital margin, can, as a rule, be diagnosed by the hard character of the underlying swelling. In erysipelas the swelling and redness are uniform, the skin feels thicker and harder, and circumscribed infiltration is absent. The

swelling occupies both lids as a rule and usually extends to the neighboring parts. The recurring angioneurotic edemas allied to urticaria, and often associated with disturbances of the menstrual period, must be considered as well as those symptomatic of migraine. The edema accompanying acute eczema is also worthy of note. The noninflammatory lid edemas, associated with cardiac disease and nephritis, often appearing under the guise of edema fugax, must also be differentiated.

The edema of acute blennorrhoea and diphtheria of the conjunctiva, iridocyclitis, uveitis and glaucoma, are, as a rule, readily eliminated. The edema of a retrobulbar phlegmon, or that expressive of a severe orbital cellulitis or abscess secondary to frontal or ethmoidal empyema must be, if possible, differentiated from the early orbital manifestation of thrombosis of the cavernous sinus. In thrombosis the lid and conjunctival swelling are marked, the eyeball is protruded and moves with difficulty, the retinal veins are enormously dilated and there is apt to be a doughy edema in the mastoid region.

In sinus thrombosis the edema and swelling are frequently bilateral and this is rare in sinus disease. Thrombosis is apt very promptly to lead to cerebral symptoms and a fatal issue. On the other hand, suppuration in the posterior ethmoid cells and maxillary antrum may, according to Fuchs, lead to sinus thrombosis, hence it will be readily understood how difficult at times absolutely accurate, differential diagnosis becomes. Our edema study can easily become more complex by the development of a meningitis, in association with oculo-orbital disease of rhinogenous origin, and this connection has been exhaustively studied by P. H. Gerber,⁶ with an analysis of fifty-one cases from literature, as well as by Onodi, in his well known work.⁷

To these have recently been added two cases by Dr. Samuel Leopold of our city, one with oculo-orbital symptoms and a second with rapid brain involvement from influenza, without demonstrable ocular signs. The first illustrated an intermittent frontal si-

nuitis with a final meningitic attack, and the second quickly terminated by a sudden apoplectiform attack. A third slow, insidious, protracted form is distinguished. When ocular complications are present, we may have disease of the inferior sinus wall or orbital roof. Thrombophlebitis may indirectly produce leptomeningitis. Here again Leopold believes the lymph channels may play an important role.

In both tenonitis and orbital cellulitis, secondary to sinus disease, edema of the lid and conjunctiva and proptosis of the eyeball are present. Again, according to Fuchs, if the chemosis is pronounced and the proptosis slight, tenonitis is probably in evidence. The opposite condition of affairs points to the deeper involvement. Dr. Posey refers to a collateral inflammatory edema of the upper lids and orbit accompanying a periostitis in the presence of acute frontal and ethmoidal sinusitis, in which an exploratory puncture showed the presence of pus, under the periosteum, but which on incision gave no added purulent matter.

Actual blackening of the lids, at times, occurs, suggestive of an ecchymosis, and this, as the edema, may be also recurrent. The value of this symptom was emphasized by deSchweinitz in his paper, "Some observations of the ocular manifestations of sinus disease,"⁸ and again in discussing Dr. Bryan's⁹ paper before the College of Physicians. The appearance and disappearance of these lid manifestations are obviously dependent upon relief from and obstruction to drainage in frontal, ethmoidal and antral empyema.

Congestion of the conjunctiva and lacrimation are very frequently present, the former extending at times to a definite conjunctival catarrh. Emphasis must also be placed upon the presence of a fugitive episcleral congestion, resembling the episcleritis periodica fugax of Fuchs, or the Hutchinson "hot eye." The dilated and tortuous episcleral vessels are deeper in hue than those of ordinary episcleritis, are said not to bleach under adrenalin, and are apt to be accompanied with very violent headache. These attacks

may last for weeks, as in a case reported by de Schweinitz, before the cause is suspected.

OCULAR INFLAMMATION.

To these may be added curious corneal phenomena mentioned by the same writer, namely, edema of the corneal epithelium, resembling that induced by cocain or a so-called wrinkling of the cornea. Posey and Gerber have seen herpetic eruptions associated with sinus disease. Of the inflammatory ocular conditions, as is well known by every ophthalmic surgeon, none is at times more baffling than uveitis and irido-cyclitis. One of the earliest reports associating this condition with sinus disease was by Dr. Posey in 1897.⁹ The eyes of a laundry worker became blind and the ball shrunk from a violent uveitis, the nasal and sinus condition being due to inhalation of acid fumes. The involvement of the cornea, iris, ciliary body and choroid, constituting this well known uveal picture, may have a very varied etiology; as syphilis, tuberculosis, enterogenous intoxication of intestinal origin, gonorrhea and the toxic products from a diseased tooth, mouth, tonsil, skin, uterine cavity or accessory sinus. It is perfectly possible that two of these sources of infection may be present at the same time, but since Ziem, Eversbush (quoted by Brawley), and many other observers have associated these conditions with sinus disease, no study is complete that lacks sinus consideration.

Disease and abscess formation in the region of the lacrimal sac, giving the symptoms strongly suggestive of lacrimal mucocele, may be the so-called pre-lacrimal abscess and have their origin in the lacrimo-ethmoidal cells. Alterations in refraction, the result of pressure from a dilated sinus, is not an infrequently recorded observation; and ciliary spasm and congestion, the outcome of nervous and lymphatic influences, may likewise contribute to the production of this phenomenon. Stewart of Portland¹⁰ has seen three-quarters of a diopter of astigmatism against the rule disappear, after surgical treatment of a sinus.

I am entirely in accord with the view that these and many others of the associated ocular and nasal conditions of indeterminate origin, but with at least a relaxed turgescence or so-called vasomotor hypertrophy, may and should be relieved by general upbuilding, with iron, as suggested by MacWhinnie, or other tonics; and supplemented by exercise, a change of climate, intestinal antiseptics and laxatives with appropriate local nasal treatment, with which you are all familiar, before operation is undertaken.

INFLAMMATORY ORBITAL SYMPTOMS.

Inflammatory conditions of the orbit are present in and the result of nasal sinus disease in 60 per cent of the cases, according to Birch-Hirschfeld of Leipsic, and indeed other authorities assign an even more important role to them in the induction of orbital cellulitis. Posey, for example, maintains that fully nine-tenths of all cases of cellulitis are secondary to sinus affections, and St. Clair Thompson¹¹ believes we should cease to regard orbital cellulitis as primary, and should look to the nose and accessory sinuses for the infection. The inflammation often persists, notwithstanding the establishment of drainage by reason of the orbit being a closed cavity. The acute or chronic purulent sinusitis was due in Hirschfeld's cases to rhinitis, influenza, pneumonia, scarlet fever, diphtheria or traumatism.

The more frequent route of orbital infection from accessory sinus inflammation is by way of the floor of the frontal, the os planum of the ethmoid and the roof in the maxillary sinus, the symptoms varying as the condition is acute or chronic. In the acute variety the eye-ball is tender, there is usually pain upon rotation, a so-called orbital neuralgia, especially upon concentrating the gaze, and tumefaction at the upper inner or inner angle, involving the inner third or half of the eyelids.

If the fundus can be seen the veins will be full, the edges of the disc veiled, the surface of the nerve too red, or edematous; with confusion of sight, diplopia, edema of lids, conjunctival chemosis, periorbital pain increased

upon pressure, dimness of vision, and a varying proptosis of the eye-ball, depending somewhat upon the primary source of the swelling, being forward, downward and outward in frontal sinusitis, with limitation of upward and inward movement, more nearly directly forward in sphenoid disease; and forward, downward and inward (Skillern) in ethmoiditis.

The completion of the symptom complex will be dependent upon the degree of cellulitis and its extension into an orbital abscess. The rapidity with which an orbital cellulitis secondary to an acute ethmoiditis may proceed to a fatal issue is illustrated in the case of Clegg, in which a girl of nineteen, previously perfectly well, developed sudden headache and vomiting, with great edema of the lids and reduction of vision to light perception. Temperature and pulse were normal. Drainage of orbit brought temporary relief, but death ensued in four days.

Hilfrich,¹² in a paper upon "Intra-orbital Complications in Acute and Chronic Accessory Sinus Disease," emphasizes the fact that swelling of the contents of the orbit, causing protrusion, limitation of movement of the eyeball, diplopia and headache, marking the acute onset of exophthalmos, may be at times the only external sign of accessory sinus disease. Mucocoeles from the frontal and ethmoid are apt to be marked by the presence of a quiet tumor at the upper and inner or inner aspect of the orbit, dependent upon the involved sinus without active inflammatory symptoms, causing displacement of the orbital contents with resulting exophthalmos down and out. This may be combined with polypoid formation and evident ethmoid disease; or, as in a case of Reber's, can exist with an entirely negative rhinogenous finding. In the latter case a spray of antipyrin, cocain and adrenalin several times a day for about ten days suddenly resulted in a gush of thick, jelly-like fluid from her throat, causing a complete disappearance of all the symptoms. These mucocoeles may result in a periostitis of the frontal floor or over the os planum. A sub-

periosteal abscess may result and may either be encapsulated or penetrate the skin of the lid.

Axenfeld maintains that the distinction between osteoma and mucocoeles, many of the symptoms of which are allied, may be made by the X-ray. The enlargement caused by mucocoeles is often of almost bony hardness, suggesting an exostosis. A tense parchment-like appearance is apt to be followed by crepitation or fluctuation. The slow growth permits an ocular adjustment, therefore there is frequently no diplopia and the failure of the optic nerve to show any radical departure from normal is explained by its straightening at the sigmoid flexure without pronounced stretching.

Gummata of the upper inner angle of the orbit may present symptoms closely simulating mucocoele distension, as in a case of Zentmayer's and a second of F. C. Parker; and here, when doubt exists as to each diagnosis, the modern syphilis tests are invaluable. The ocular changes secondary to sinus disease appear usually in adult life, but a number of well recorded cases appear in infancy and early childhood.

Dr. Frederick Krauss and William Campbell Posey of this city have reported cases of orbital abscess secondary to maxillary sinusitis. In Dr. Krauss' case the disease appeared at four months and in Posey's between one and three years. Posey had originally regarded them as osteomalacial in origin. Onodi records the size of the maxillary sinus at one year of age as 5 by 3 millimeters, up to 19 by 8 millimeters in size, and in fetus of 6½ months the same author found a maxillary sinus 3 by 1.5 millimeters.

OCULAR MUSCLE INVOLVEMENT.

This aspect of the subject has been carefully elaborated by Sauvigneau, Peyser, Galezowski, Bernheim, Posey, Reber and others. Interference with the mobility of the eye usually results from mechanical displacement associated with a distended sinus wall, or from the presence of exudation, yet asthenopia and paretic or paralytic conditions of the ocular muscles do occur in sinusitis entirely apart from such

displacements, and occasionally may be an accompaniment of even a mild sinus involvement. These later cases, as Bernheim and Skillern suggest, are apt to be the result of the selective action of a toxin, just as is true of the infectious diseases, autointoxication and influenza.

The anatomic relations will readily point to the frontal cells as responsible for involvement of the superior rectus, superior oblique and the levator, and Sauvigneau has associated the internus and accommodative muscle involvement with frontal disease, although the lack of power in the interni usually points to ethmoidal disease, and that of the inferior rectus and inferior oblique are most apt to indicate antral disturbance. The intimate association of the nerves which supply the ocular muscles with the outer wall of the sphenoid will readily explain in part the muscle disturbance, and disease of the sphenoid is regarded by some authorities as the most frequent cause of muscle involvement of sinus origin. The ethmoid, frontal and antrum probably offend in the order mentioned.

In acute cases paresis or paralysis are occasioned by direct inflammatory infiltration of the long flat belly of the muscles themselves as they lie close to the sinus walls, or by involvement of the nerves as they enter the orbit. In many instances diplopia is not complained of, but is detected by the red glass and a search in the peripheral field. Diagnostic help is gained by noting the pain when the eye is turned in the position that calls forth the greatest movement of the affected muscle. The use of the eyes is difficult and painful, confusion of vision, vertigo and reflex gastric disturbance are frequently present.

Alternate dilatation and contraction of the pupil is reported by McBean¹³ of Chicago in a paper upon variations in the sphenoid sinus; and two cases of pupillary dilatation in sphenoid disease are reported by Sluder. The condition was one of acute sphenoiditis in McBean's case, with pain back of eye and in occiput with severe asthenopia. In a few days wide dilatation of the pupil was followed by myosis, with spasm of accommoda-

tion. All local medication was resisted, and the case cured by an autogenous vaccine. McBean regards the explanation of the phenomenon as an irritation of the carotid plexus of the sympathetic, producing mydriasis, and considers that later motor oculi irritation produced myosis. Baumgarten and Lapersonne are quoted by Onodi as also having seen oculomotor paresis and paralysis from sphenoidal disease.

The picture of complete palsy of the levator palpebrae (right) from frontal sinus empyema is apt to include severe neuralgic pain in the supraorbital and frontal region with marked tenderness upon tapping. The globe movements were unrestricted. Conservative treatment to the frontal sinus by Dr. George B. Wood in this instance caused a rapid improvement. The close apposition of the muscle to the sinus floor and the absence of sphenoid and ethmoid disease established a diagnosis of direct involvement. It is not always easy to differentiate between edema and paralytic ptosis, each at times being fugacious and recurrent.

In the more chronic types of sinusitis, the disturbance of the eyeball is slow, because the sinus distension is very gradual and the muscles adjust themselves to varying conditions. The so-called rheumatic ocular palsies are thought by a number of authorities to be more often due to sinus disease. It is perfectly well known that many of these ocular palsies are due to specific disease and every oculist of experience has seen cures result from large doses of the iodides. But if the possibility of sinus origin be kept in mind we will frequently produce a rapid cure by the sinus route.

OCULAR FUNDUS CHANGES UNACCOMPANIED BY EXTERNAL INFLAMMATION.

An exhaustive ophthalmoscopic and perimetric examination becomes of especial importance in those cases of sinusitis in which changes in the fundus oculi are present without any external signs of orbital or ocular inflammation. These changes may be a retrobulbar neuritis—a papilledema or choked disc, an optic neuritis, neuro-retinitis, thrombosis or phlebitis (de Schweinitz), retinal detachment, and finally definite blind or

blurred areas in the visual field, without ophthalmoscopic evidence of ocular disease.

The areas of greatest significance in the study of intraocular disturbances are two in number; first, the macula with its acute recognition of white and color, and second, the optic nerve at its point of entrance into the eyeball, the latter being the so-called "silent" area or the blind spot of Mariotte. The presence of symptoms of optic nerve involvement (as emphasized strongly by distinguished authorities) are the most dangerous of the sinus pointings and if not relieved by suitable drainage may be followed by atrophy. If these changes are unilateral they especially call for sinus study.

The importance of repeated field examination in arriving at a more definite diagnosis is emphasized by such a case as reported by Heed, where a female of 39 complained of blurred vision and vertigo, and in which a fundus examination showed only a suspicious hyperemia of the disc, but with normal fields. Five days later an active neuritis with contracted fields existed. Treatment to the ethmoid cells caused a rapid cure.

The presence of a central scotoma, in the absence of any demonstrable ocular involvement in the media, retina or choroid, points definitely to a macular lesion; and is pathognomonic of an axial orbital or retrobulbar neuritis, which is ordinarily caused by the circulation of an infecting agent in the blood; this toxemia inducing an interstitial inflammation of the so-called papillo-macular bundle of the nerve, most marked in the optic canal. For these fibres certain toxic products have a special affinity, and the scotoma when present is usually first for colors and later for white.

This toxemia, as a rule, results in a temporal pallor of the disc, but the discovery of the scotoma precedent to the change in the appearance of the disc usually points to the need of immediate improvement of sinus drainage, and hence may warrant operative interference when no demonstrable signs of sinus disease are present. If the infecting agent manifests its baneful influence on the intraocular end of the nerve as a choking of the disc, an actual neuritis or further

extension into the retina, these significant ophthalmoscopic pictures can readily be determined.

The perimetric findings associated with, or the direct outcome of sinus inflammation, have been carefully studied by a considerable group of observers, prominent among whom are: Birch-Hirschfeld, Fuchs, Jessop, Ziem, van der Hoeve, de Kleijn, Markbreiter, Ramsay, Southerland, Samuel D. Risley, de Schweinitz, Knapp, Reber, J. Norman Risley, MacWhinnie, F. J. Parker, Fridenberg and Peter.

There may be concentric or irregular contractions both for form and colors, and occasionally bitemporal hemianopsia, (Evans-Birmingham.) but the scotomas of varying types are more generally present, have more diagnostic significance, and those of the so-called peripapillary variety have been regarded by some observers as practically pathognomonic. As the sinuitis is more usually unilateral, so is the central scotoma. This fact has received special emphasis by Weeks of New York; but this will, of course, vary with the extent of the sinus involvement and may be bilateral and be present both for form and colors. The scotomata of the more usual toxic varieties caused by the various systemic toxemias are much more apt to be bilateral.

In our study of central scotoma three important groups, representing varying types of causation, must be considered from a differential viewpoint. First—Toxic amblyopias caused by alcohol, tobacco, lead, arsenic, iodoform, stramonium, carbon dioxide, mercury, opium, male fern, etc. Second—Intestinal toxemia, syphilis, tuberculosis, diabetes, gout (so-called), gonorrhea, influenza, malaria, the infectious fevers. Third—The mouth, teeth, tonsils and accessory nasal sinuses; and it has been generally believed that the posterior sinuses are the special offenders.

It must always be kept in mind that one or more of these systemic conditions may be responsible for a toxemia which induces the nerve changes, or may result in the sinus empyema, which in turn may be the direct excitant of the nerve or retinal lesion. Hillitzer¹⁴ believes optic nerve conditions due to involvement of

the ethmoid, and sphenoid sinuses are as a rule diagnosticated by exclusion.

In the absence of intoxications, with a negative Wassermann, the presence of an axial or retrobulbar neuritis acute or chronic (especially if unilateral since in the former condition the nerve disturbance is usually bilateral) the possibility of a disseminated sclerosis should be carefully considered; and under such conditions disturbances of gait, sensation, and reflexes should be studied; and indeed if a sinus infection is present, such as ethmoiditis, combined with the symptoms of disseminated sclerosis, as was true in a case reported by Shumway, the possibility of the toxin from the purulent focus causing the nerve degeneration as suggested by that author must likewise be kept in mind.

The differentiation between the fields of vision of intraocular states due to sinus disease; and those due to or associated with general toxemias, in which no sinus disease was suspected nor present, are, as pointed out by S. D. Risley, sometimes exceedingly difficult to make.

Central scotoma, narrowing of fields, edema of fundus, veiling all details, large dark tortuous veins, hemorrhages in fibre layer of retina or at the macula may be present, and yet it may be impossible to demonstrate sinus disease. On the other hand, all the above symptoms may be present in association with disease of one of the sinuses in the anterior segment of the skull; and it is not always easy to say they were caused by it, as both the sinus and ocular disease were associated with, and probably caused by, the same systemic toxemia.

Paracentral scotomas of horseshoe shape disappearing in segments, are described by MacWhinnie and a similar variety is emphasized by de Schweinitz, the paracentral often becoming hemianopic and resembling the hemianopic scotoma of Treitel.

The crescentic field defects such as were reported by the same author, in a case of posterior ethmoiditis combined with tooth abscess, may be part of a ring scotoma, either previously present or not yet completely formed and easily influenced by measures to remove the toxemia, that is to say, treatment of sinus and tooth.

The ring scotomas may become central and usually improve and disappear with adequate drainage unless permanent damage has resulted from the pressure or toxemia.

The presence of a ring scotoma, according to MacWhinnie (quoted by Fridenberg), would indicate accessory sinus involvement even when the retained infection was not evident to the probe. When inspection of the nose points to definite sinus involvement, especially posterior, a typical field will be an enlargement of the blind spot and a paracentral scotoma.

The nerve lesions in central amblyopia consist in edema and proliferation of the glia cells, and later possible destruction of the nerve fibres (Birch-Hirschfeld). The cause, according to Birch-Hirschfeld, is venous stasis and toxic agencies.

Bryan believes that nerve toxemias can be caused by mucocles, as well as by abscesses; and the symptoms, often extremely difficult to explain, may be the result of anomalies in the posterior cavities. The sphenoid may be in relation to both nerves. The posterior ethmoid may be on the other hand in close proximity to one and not to the other; and furthermore, it is Bryan's opinion that the presence of bilateral nerve involvement may be explained by transference by way of the chiasm without necessarily indicating the presence of a bilateral sinuitis.

In such a study as this special emphasis should be laid upon the work of van der Hoeve and its further development and confirmation by de Kleijn. The enlargement of the blind spot constituting the so-called peripapillary scotoma, of van der Hoeve has been thought to be pathognomonic of involvement of the posterior group of cells (sphenoid and posterior ethmoid), this toxemia expressing itself upon the peripapillary bundle as the first portion involved in a retrobulbar neuritis.

In attempting to outline a van der Hoeve phenomenon it must be remembered that the optic nerve, as it enters the eye, has no ganglion cells, no rods nor cones, and is therefore blind. This blind spot is located 15° to the temporal side of the actual point of fixation. In hyperopic

eyes it is further away, as far as 19° , while in myopic eyes it is down to 11° . As to the important question, what actually constitutes an enlargement of the blind spot, van der Hoeve considered over 6° in the horizontal diameter as suspicious and over 7° as too large.

Van der Hoeve found the peripapillary scotoma only in posterior sinus disease, and maintains that central color scotoma always secondary to sinus disease, appeared later if at all; whereas, in toxic retrobulbar neuritis this symptom and the van der Hoeve scotoma were present simultaneously. De Kleijn noted that the enlargement of the blind spot for colors, preceded that for a white. The presence of this symptom according to some authorities justifies operation on the affected sinus, if no other cause for the blind spot enlargement can be found.

These deductions we will probably modify by reason of the more recent work of Markbreiter in an important paper on the changes in the visual fields in diseases of the nose and accessory sinuses, in which he reported results of investigations of the field in one hundred cases of empyema, carefully excluding all cases in which the eye itself manifested any changes that might cause any visual field disturbance.

In this series of cases sixty-three involved the anterior group of cells; and of these seventeen were frontal and thirty-one maxillary, three anterior ethmoid and frontal, nine involved the posterior group, three were cases of pansinusitis, and in the remaining twenty-five the exact location is not specified.

Visual field changes were found in seventy of the hundred cases, although the fundus in each case was normal and the vision perfect. This, it seems to me, is a very important observation. In the anterior empyemas, field changes were present in forty-eight out of sixty-three cases and in seven out of nine in the posterior group.

Of the seventy cases of defective fields the blind spot enlargement was present in fifty-two, seven showed central, and eleven other forms of field defect, such as island, ring defects and peripheral contraction. Markbreiter has never seen enlargement of the blind spot pass into cen-

tral scotoma. In eleven out of thirty-seven nonsuppurative diseases of the sinuses, field changes were present.

The further important deduction from this study is, that while enlargement of the blind spot constitutes the most frequent of the nerve manifestations of accessory sinus disease, it presents no diagnostic features by which we can positively say whether the anterior or posterior group of cells is involved.

The fact, however, that enlargement of the blind spot may sometimes be present either with or without surrounding rings of color scotoma, and the further fact that these scotomas may antedate by some considerable time organic changes in the nerve head or other gross ophthalmoscopic alteration, is an exceedingly important observation of van der Hoeve, de Kleijn, Onodi, and has been confirmed by a number of American observers (de Schweinitz, Norman Risley), and while it may not definitely indicate which sinus or group of sinuses is involved, it constitutes a very significant sign post in the direction of sinus disease.

Optic neuritis and neuro-retinitis may be caused by an inflammation of any of the nasal sinuses. In a case reported by Arnold Knapp resection of the anterior half of the middle turbinal and curetting of the posterior ethmoid caused a return to normal vision and fundus, and eliminated a central relative scotoma for white and colors.

An optic neuritis, in which the summit of the disc was plus four, with an ocular proptosis and reduction of vision to one-fifth of normal, in which frontal ethmoidal drainage by incision under the orbital rim from a point under the middle of the front inward to the nasal front and downward along its border with complete recovery, was reported by Dr. Risley. This procedure was adopted in 1903 and the patient whom I saw this past week has scarcely any deformity, and normal vision. This author much prefers the procedure here adopted as offering adequate drainage and a very inconsiderable scar.

Monolateral optic neuritis may exist for a prolonged period with normal vision, as in the case reported by Rau, where systemic treatment caused

marked improvement in a case lasting a year. Recurrence was noted in two years with decreased vision, frontal headache and pain on percussion over the frontal sinus. Examination now showed a maxillary sinusitis of the same side, operation upon which cured the neuritis and largely restored vision. This case emphasizes the fact that pain is not an absolutely reliable guide, as none was present over the maxillary and all over the frontal.

The tolerance of the optic nerve and retina to interference of toxic products of, or direct pressure from, ethmoidal empyema, is well illustrated by a case reported by Dr. S. D. Risley ten years ago, before the association of these conditions was by any means so generally recognized. It likewise confirms an equally important observation that the ordinary depleting absorbing and eliminating measures so generally applied to cases of neuro-retinitis, with flame shaped hemorrhages and contraction of the field will frequently cause amelioration of all the symptoms. The recrudescence of the ocular condition in this instance caused the consulting neurologist to fear intracranial involvement. Operation on the anterior ethmoid cells and consequent drainage of frontal and ethmoid resulted in a complete cure, the latter not having been performed for two years after the initial symptoms.

I venture the opinion that all of us today would immediately take the sinuses into account at an initial visit in the presence of a unilateral neuro-retinitis with or without hemorrhages. The case of a physician recorded by Parker of New York, with concentric contraction, central and van der Hoeve scotomas varying with the condition of the sphenoid and posterior ethmoid cells combined with double papilledema is of special interest. The maxillary antrum was also involved, but the cure of the ocular condition followed operative treatment directed to the ethmoid and sphenoid sinuses, vision at one period being reduced to shadows in each eye and returning to normal only when the last posterior infected cell had been drained.

Retinal thrombosis as symptomatic of sinus disease is referred to by a number

of writers. Wendell Reber reported a case of thrombotic involvement of the central retinal vein, which was negative to all types of examination, even rhinologic. In his characteristic phraseology, he pictures the nasal disease as sweeping in, doing its damage and possibly disappearing by the time the retinal disease is apparent.

Notwithstanding a negative examination so far as empyema was concerned, he insisted upon rhinologic local nonoperative treatment and a cure resulted in four weeks. Reber believes many of these cases of thrombosis of the central vein are due to undiagnosed latent obscure sinus disease which need not be purulent.

In this perhaps too prolonged recital many vital points have been left for consideration and review by the specialists present, whose extensive experience and reputations entitle their pronouncements to the most distinguished consideration.

These subjects include the importance of blood study with hemoglobin determination and differential count, the relation of blood pressure, intestinal toxemia and the varying infections, the conservation of tissue as opposed to its destruction and removal, the value and limitation of vaccine therapy, the bacterial study as indicating the extent to which conservative treatment is justified, the limitations of X-ray and transillumination as adjuncts to accurate diagnostic study, the best conservative nasal treatment, which, according to one author (MacWhinnie), will cure 97 per cent of these cases, the value of suction in the conservative management, and finally, the most approved operative intervention so often essential to the preservation of vision and at times to the prevention of meningitic involvement.

The important opinions of the participants in the discussion of the evening have been dug out of the mines of the years of toiling in an effort (in the apt phraseology of Edward Jackson) to "Push back the ever widening margin of the unknown." If our interdependence in our closely allied fields of endeavor has been given an emphasis, the purpose of the writer will have been achieved.

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NOTES, CASES, AND INSTRUMENTS

In this department will be published brief reports of cases, descriptions of new instruments, and suggestions of interest to ophthalmologists.

ATROPHY OF THE IRIS.

FRANK ALLPORT, M. D.

and

JAS. R. SMITH, M. D.

CHICAGO, ILL.

On account of the infrequency of this interesting pathologic condition, we desire to report two cases of atrophy of the iris. There are few cases of this kind reported, and various observers have reported essential differences—both as to the clinical findings and the etiology of the cases in question.

At the outset aniridia—as this is usually a congenital condition—must be excluded. Cases of aniridia have been reported, but this condition, both by means of the history of the case and physical findings, make the exclusion comparatively simple. According to Fuchs, atrophy of the iris may supervene as the result of various causes:

(1) Long continued or recurring inflammations.

(2) Increase of tension, involving the portion of the blood vessels at the root of the iris.

(3) In consequence of iridodialysis or traction.

(4) As the result of a too thorough

absorption, i. e. when swelling fragments of the lens lie upon the iris and are absorbed.

Appearances of the eyes of these patients present, of course, varying clinical pictures.

Case I.—This patient—Miss. R., aged 25, is a trained nurse. She suffered an attack of typhoid fever eight years ago and four years later had an inflammation of the right eye, which was diagnosed iritis. Up until the time of the iritis attack, both of her eyes had been normal. There is no history of trauma in this case. The inflammation in her right eye was a long, protracted affair, from which she never fully recovered. There were intervals of quiescence, then the eye would flare up again and become irritable. When we first saw this young lady, about Feb. 1st, 1918, the eye was quiet. Then tension of the eye was minus 3, i. e. it was quite soft. As a general thing, these reported cases of atrophy of the iris

have a complicating glaucoma and the tension of the eye is increased.

In this eye about one-half of the iris tissue had undergone atrophy. There

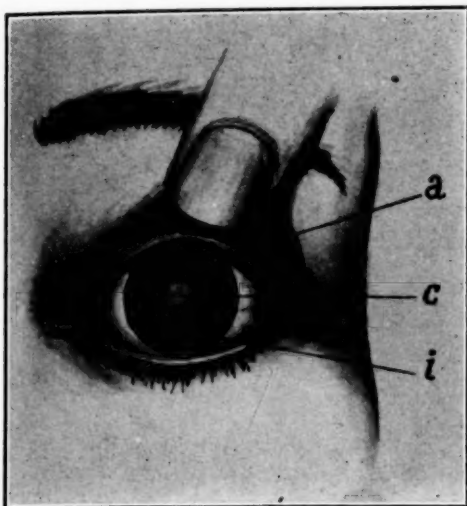


FIG. 1.

Atrophy of anterior layer of iris (a) Atrophic area.
(c) Cataract. (i) Iris unchanged.

were no gaps in the iris so that no part of the iris stroma per se had wholly atrophied. A large central portion of the iris, above the pupil and as shown in the accompanying diagram, had atrophied. The normal color of this iris was blue, but the atrophied portion had changed to a brownish black. There was a complete annular synechia and the lens was cataractous and white. The anterior chamber of the eye was of normal depth and the cornea was clear. The treatment advised, and subsequently carried out in this case, was enucleation. The eye was stone blind and with the future uncertainty concerning sympathetic ophthalmia, the operation of enucleation was performed. The accompanying diagram,

Fig. 1, will show the clinical picture this eye presented.

Case II.—In the present instance there is a complete gap, or absence of iris tissue, at the point in the diagram marked *a. i.* In the report of the first case, it was stated that the atrophy of the iris had occurred with no loss of iris stroma. In this case there is absence of the iris stroma. One may look with an ophthalmoscope through the gap of the iris and obtain a good fundus reflex, although no details of the fundus are discernible. The etiology of this case is ophthalmia neonatorum; altho there has been no active inflammation in the eye since infancy and our patient, Miss L., is now twenty years of age. As the accompanying diagram of the eye will show, there is a large corneal opacity, *C. O.* A thin rim of iris, *i*, shows around the periphery.

Both of these drawings were made by the artist from the human eye.

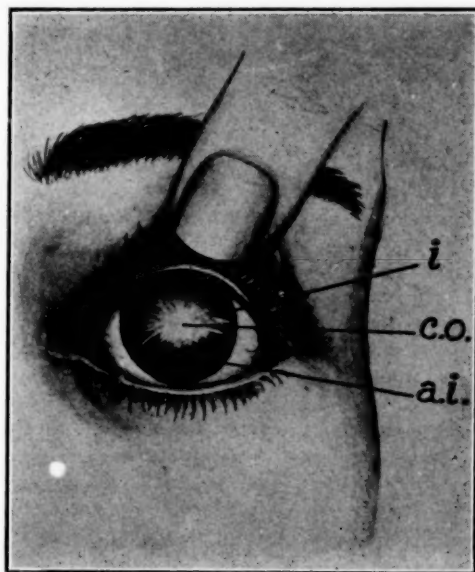


FIG. 2.

Atrophy of whole thickness of iris. (a.i) Space left by atrophy. (c.o) Corneal opacity.
(i) Rim of iris seen at periphery.

BLEPHAROSPASM SECONDARY TO PYORRHEA ALVEOLARIS.

H. M. THOMPSON, M. D., Pueblo, Colo.

H. G., a farmer of 52 years, bachelor, had enjoyed excellent health with the exception of so-called "rheumatic attacks." The eye disturbance began some weeks before the patient came to Pueblo. He apparently first noticed a conjunctival irritation. After a few days, the lids closed tightly in a tonic cramp, involving the whole of the orbicularis palpebrarum. The lids could be opened with difficulty under cocaine anesthesia. The conjunctiva was inflamed, the cornea clear, the iris normal in color and the pupil greatly contracted. It was impossible at this time to examine the fundus of either eye with or without the pupils dilated.

A general examination of the patient was negative, so also was the urine. Dr. Maynard reported the Wassermann negative.

After four weeks of varied eliminative treatment with iodides, inunctions and profuse sweating, the latter given because of an admitted luetic possibility in younger years, the patient's suffering became more intense. The lids remained so tightly closed that there developed constant pain and some edema apparently caused by the fixed and intense muscular contraction.

The only visible possibility of an etiologic factor was the chronically inflamed and pus laden gums. A rather severe pyorrhea with loose teeth, suggested to me early the chance of a focal infection, but the patient refused to have the teeth extracted until the other treatment failed. Eventually, after four weeks of suffering, he agreed to see a dentist who removed all the teeth. The next day the patient was able to open his eyes and on the fourth day, he returned home with apparently normal ocular condition.

The fundi were "fluffy," but showed no discernible lesion and the conjunctival inflammation immediately cleared.

It appeared to me as a rare and interesting case, because of the long con-

tinued cramp of the orbicularis muscle secondary to a toxic inflammation of all the coats of the eye, due to a focal infection. The almost absolute proof of its focal origin would seem to be in the immediate cure after the removal of the teeth.

HYSTERIC AMBLYOPIA.

FRANK A. MORRISON, M. D.

INDIANAPOLIS, IND.

Case 1.—Girl age 11 of rather a nervous disposition. Very ambitious at school where she had repeatedly led her class. No history of recent illness whatever, in fact, according to the mother, has always enjoyed exceptional health. For a week preceding her visit she had been studying closely for an examination, and had expressed a fear that she would be passed by another pupil.

She was successful in maintaining her class standing, but noticed the day before she came under my observation, that she was blind in the right eye.

At the first examination the admitted vision in the right eye was 20/80ths, but varied from time to time. Pupil slightly dilated, and contracted but slightly to light, both direct and consensual. Almost no accommodation reaction.

Field of vision could be taken only imperfectly, but showed concentric contraction for white. Colors too indefinite to warrant any conclusion.

Placed before the test type with a plane glass before the eyes (both remaining open) vision was 20/20ths. Suddenly removing the plane glass from before the left (good eye) and substituting a 10D. lens the vision in the right (or "blind") eye was 20/20ths.

Retinoscope showed under mydriatic .75D. of hyperopia in each eye. Examination repeated with this correction gave same result. Fundus normal. Diagnosis: Hysteric amblyopia following mental strain.

Case 2.—Boy age 12. The day pre-

ceding his visit he had been playing in the snow, and had come running into the house saying he had gone blind, and that a great black cloud was before both eyes. In a few minutes the left eye recovered, but the right remained blind. A physician was called but made no diagnosis.

At the time of his visit he was wearing a heavy bandage over the eye, complaining of pain when it was removed, but asserting he had no light perception. The pupil in the blind eye was somewhat dilated and its response to a light from a small electric lamp was questionable. No accommodative movement of the pupil.

Patient admitted no vision and asserted he could not tell when the light from the ophthalmoscope was thrown into the eye. Examined as in Case 1 vision in the blind eye was shown to be 20/20. Under mydriatic retinoscope showed only 0.25D. of hyperopia with a normal fundus. Diagnosis: malingering or hysteric amblyopia but probably the latter, as the boy expressed concern lest he would miss school. A possible explanation is, hysteric amblyopia due to fear of blindness resulting from persistence of after images.

CORNEAL LOUPE.

ROBERT VON DER HEYDT, M. D.
CHICAGO, ILL.

This loupe with self illuminating field was constructed as a help to ophthalmologists in examining the cornea, iris, anterior chamber, crystalline lens and capsule, and to aid in recognizing lesions of these structures.

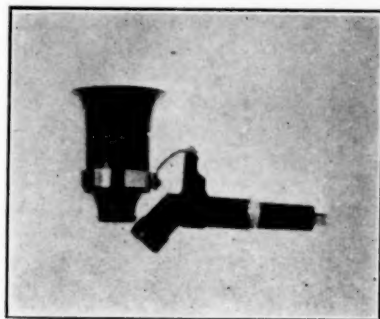


FIG. —.

Von der Heydt's Corneal Loupe.

The lens in the instrument is of three-quarter inch focus, and is aplanatic. Attached thereto is a tubular angle piece, with small electric bulb and condensing lens, which well illuminates field in focus. The instrument was shown before the Chicago Ophthalmological Society, November, 1917.

SOCIETY PROCEEDINGS.

COLORADO OPHTHALMOLOGICAL SOCIETY.

January 19, 1918.

DR. MELVILLE BLACK, Presiding.

Unusual Cataract.

DR. E. T. BOYD presented a patient, aged 36, with lenticular opacities. In March, 1917, this patient consulted Dr. Boyd on account of headaches, so severe that he was unable to sleep for three weeks previous to this, and morphin had failed to relieve the pain. V. O. D. 20/20; V. O. S. fingers at 15 ft. He was given lenses to correct his vision and this

completely relieved the pain. In January, 1918, he returned with reduced vision. One lens is now opaque. The teeth, sinuses, and Wassermann are all negative.

DISCUSSION.—Dr. Edward Jackson said this man had lost his wife last August, is very nervous and in a run-down condition. He believes the cataract is due to the patient's poor general health, especially since he does not give a history of having had tetany, and has not used naphthalin in any form. He now has a patient who from 30 to 40 developed cataracts in each eye following tetany. She has had one operated, and the other may

require it. The urine is negative. There was a decided change from hyperopia to myopia, attributable to the swelling of the lens.

Dr. Melville Black suggested the use of subconjunctival injections of mercury, 1-5000, for deposits on the posterior lens capsule. This cannot do any harm and while it does not benefit senile cases, it may help Dr. Boyd's patient a great deal. He would also improve the general nutrition.

Dr. H. M. Thompson said this cataract case is unusual, rapidly progressive, and undoubtedly due to some undiscovered systemic change, evidenced by his loss of weight and general lowered vitality. He did not agree that local treatment might be used with any prospect of improvement. To treat an advanced case of this kind only brings discredit on the early treatment of cataract. The only cases amenable to treatment are those discovered early, where the opacity is just beginning and looks like dust particles suspended in the lens substance.

In the plethoric individual, intense eliminative treatment, sweat baths and regulation of the diet are advised; finding and removing any possible foci of infection and doing all those things which will be conducive to an improvement in the general well being of the patient. Every case demands individual therapy suitable to the physical condition. If cases are not properly selected in instituting treatment, the oculist will meet with much disappointment in this particular field, and will condemn the therapy that at times brings benefit to the patient.

Uveitis with Punctate Keratitis.

Dr. BOYD presented a patient who had an operation for exophthalmic goitre at the Mayo Clinic one year ago. Three weeks ago he developed herpes zoster ophthalmicus, but had clear vision. He also gave a history of having had gonorrhea with arthritis of the knee. The accessory sinuses, the teeth, and Wassermann were negative. The anterior chamber is deep, and the uveitis is due to gonorrhea.

DISCUSSION.—Dr. D. H. Coover said he had had a similar case due to gonorrhea.

He took the tension and this was 70 mg. of mercury. He was perplexed at it being so high in iritis. He stopped the atropin and used eserine. The tension dropped to 35 mg. of mercury in a few days, however, the media were cloudy and he could not see the fundus. He considered this a typical case of gonorrheal iritis. Injections of vaccine were used several times and the patient fully recovered. He asked what the significance is of increased tension, and if it is high in all cases of iritis. He thinks the anterior chamber, being too deep, may possibly have been a factor. The pupil dilated very readily. There were no synechiae, until after eserine had been used. Atropin broke these up later, after the tension had been normal for some time.

Dr. W. H. Crisp said atropin will eventually lower the tension of these cases if we continue to use it.

Dr. Jackson said he has seen several cases of iritis with the tension between 50 and 60, and he believes that hypertension is common. Snellen tapped the anterior chamber in several cases and obtained germs in the cultures made from the aqueous.

Dr. Melville Black said in cases of gonorrheal iridocyclitis the vas deferens should be milked. This has been done with very great improvement.

Corneal Abscess.

Dr. BOYD presented a case of corneal abscess. This began three or four weeks ago. There was first an ulcer, and this penetrated more deeply into the corneal lamellae, but there was no undermining of the edges. The eye improved for a few days under treatment, but the fourth day hypopyon developed. Cyanid of mercury was used subconjunctivally, with novocain, followed by wonderful improvement in one week. Later there was violent pain with increased tension and perforation during the night. This patient showed a deep stain about the margins of the ulcer, due to the silvol which was freely used.

Iritis with Synechia.

Dr. BOYD also presented a case of iritis, with posterior synechia above and below. Atropin was used; cyanid of

mercury was injected subconjunctivally; and the adhesions were broken up by the next day.

Fibroma of Orbit.

DR. D. H. COOVER presented Melvin J., age 11, operated last August, who was exhibited before this society by Dr. Stilwill for proptosis of O. S. in April, 1917. On account of the extreme proptosis, which was about 6 mm., he chose the external route. He resected the external rectus; loosened the orbital tissue; pulled the eye well forward and inward toward the nose, which gave him quite a cavity to explore. He passed his finger into the orbital cavity, and found a firm mass lying on the temporal side of the orbit. This mass occupied about one half of the orbital cavity and extended back to the optic foramen, and down to the floor. The upper border of the tumor could be distinctly felt, and there he made an incision thru the periosteum to the bone. With a small periosteal elevator he dissected the tumor from the side and floor of the orbit. In trying to remove it he found that it was adherent to the nerve and optic foramen. In dissecting it from its attachment, he severed the nerve and removed the eye with the tumor. The optic nerve was adherent to the tumor, but was not in the body of it as he had supposed. By a Kroenlein operation it might have been possible to save the eye. The tumor was kidney shaped, 35 mm. long by 25 mm. wide. Dr. W. C. Finnoff made the pathologic examination and reported it a fibroma.

Scleritis.

DR. H. R. STILWILL presented a lady patient, who was first seen by Dr. G. L. Strader last August. The patient was under treatment, at that time, for a few days only. She had redness of the eye, but no pain. There was deep injection of the sclera recently. She had very bad teeth, and part of these were removed. Others have been removed more recently. Salicylates have been given freely and eliminative treatment used. V. 20/100 on December 1st, 1917, with hyperesthesia of the right side of the scalp. Dr. Stilwill said the teeth were X-rayed, when he first saw this case. Seven teeth had root abscesses and these were all re-

moved, but there has been no change in the eye since. The patient has received calomel, sweats, salicylates, etc.

DISCUSSION.—Dr. Crisp said he had seen several cases similar to this and he believed this one will improve later. He had a slow case of iritis improve three weeks after extraction of the teeth. No other etiology was found. He believed the absorption of toxins had not ceased in Dr. Stilwill's case.

Dr. C. E. Walker stated that if constitutional disease was present he would find this as well as examine the teeth and the gastro-intestinal tract. The patient should also be examined for lues and tuberculosis. He would call in a competent internist, as the laboratory examinations are very important.

Dr. G. F. Libby saw a child, this past fall, with scleritis. The father had been tuberculous. Such a child was predisposed to scleritis. An outdoor life, etc., cured this case entirely. He said if the root cavities were curretted, iodine used, and the cavities packed in Dr. Stilwill's case, there will be a slow recovery; as there was much poison in the system this must be eliminated before we can expect improvement in the eye.

Dr. J. A. McCaw referred to a woman, age 45, with severe scleritis last spring. The teeth were thoroughly cleaned and eliminative treatment was used. Aloes, iron and calomel were given with K. I. in increasing doses. She made a rather speedy recovery. She returned last fall, however, and was given K. I. again. She returned last week, for a third time, with a badly inflamed eye, showing that these cases are difficult to cure permanently.

Dr. E. E. McKeown said, cases with abscessed teeth should have a vaccine made from the cultures of the germs growing in the root abscesses.

Dr. Melville Black concurred with these remarks. He said if we extract the teeth it makes the eye worse for a few days, and the eye may not improve for a month, but this should not discourage us.

Tuberculosis of Uvea.

DR. MELVILLE BLACK presented a patient, age 42, who came under his care a year ago. She complained then of slight

failure of V. O. S.; was conscious of the eye all the time and of a hot feeling in it. Upon going into a closet would see colors. These symptoms had been present for about ten days when first examined. Ophthalmoscopic examination showed the media were clear, the optic disc had a dirty appearance and the macula was a darkish spot, with no central reflex. V. O. D. was 20/15, and V. O. S. 20/20. The campimeter showed some enlargement of the blind spot.

Dr. Robert Levy had removed her tonsils and Dr. L. Freeman had removed gall stones, and the gall bladder in the summer of 1916. She was sent to Dr. Levy for a sinus examination. He had radiographs taken and reported the examination negative. She was sent to Dr. Hoffman for radiography of teeth. He found the lower left bicuspid was diseased. It was pulled. Wassermann negative. She went to her home in Nebraska and while there saw Dr. H. Gifford. Dr. Black has had no report from Dr. Gifford, but he was apparently puzzled. He also had radiographs taken of the head and teeth.

Dr. Black saw her again on the 4th of January. She had only L. P. in this eye, and it was inflamed and painful. The ophthalmoscope showed a vitreous obscuration. The reflex was good, but the cloud was impenetrable. With a +14 D. lens the anterior portion of the cloud was in focus and something like fine blood vessels could be seen, which seemed to have a vertical direction and came down from above. It presented the appearance sometimes seen in the early stages of the formation of a massive exudate, and he was inclined to think some such process was going on. The patient was given 1/7 mg. of old tuberculin, which caused a good deal of general malaise, but no elevation of temperature. The eye was more red and painful and the site of the injection indurated. There was no evidence of hyper- or hypothyroidism. She complained of a tenderness in the region of the appendix, but whether she has had a chronic inflammation there has not been determined. He stated that this patient received 1/20 mg. of tuberculin 5 days before the meeting. The eye has been better since and

there has been slight lacrimation, pain and redness. The posterior synechia below were found after using atropin.

DISCUSSION.—Dr. Jackson said he used transillumination recently, but this was not very satisfactory, nor was it very satisfactory in the better eye. He thought there was something back of the vitreous, as there was very yellow reflex. The whole picture made tuberculosis the most probable cause.

Dr. Walker said he had a case with old posterior synechia in the first eye. The second eye later became involved and reminded him very much of the inflamed eye in Dr. Black's patient. The Wassermann test was negative, but the tuberculin test was positive. This patient was being treated by an internist with tuberculin. With so much blocking of the canal of Schlemm he gives K. I. and mercury. The vision has improved to 20/30.

Dr. Thompson advised that the internist look carefully into the condition of the alimentary tract. The patient admitted having had pain in the region of the appendix. Other possible causes have been excluded, but the one great factor in many cases of chronic uveal tract diseases has been ignored. Elschnig classified these particular forms of eye diseases as having their etiologic factor in some disturbance of the intestinal tract; which interferes with proper intestinal digestion, thereby allowing bacterial toxins to enter the blood stream. Inasmuch as these chronic eye conditions, with subacute exacerbations, are mostly secondary, local treatment is of little avail unless the primary focus has been removed.

Dr. Thompson had reported in *Colorado Medicine* last September, a cure of most unusual case of this kind. The patient, a woman of 32 years, had suffered from recurrent, so called "rheumatic" attacks, at times affecting every joint in the body. She had experienced this condition since she was 9 years old. Eventually a vertebral polyarthritis left the thoracic column curved to almost an angle of 45 degrees. The vision was greatly decreased from the frequent attacks of iritis. Although this patient showed no definite abdominal symptoms, an explor-

atory abdominal operation revealed a chronically ulcerated appendix, with adhesions around the cecum. She made a prompt recovery; has not had a return of the iritis or the arthritis; and has since given birth to a healthy child.

Steel in Orbit.

DR. F. R. SPENCER made a subsequent report upon the case of Master R. P., age 5, presented at the December 15th meeting, with a fragment of steel in the right orbit. Three days after the December meeting, the giant magnet was applied at the center of the cornea with the result that the steel was moved outward about 11 mm., but not forward. The lens haze and vitreous hemorrhage were unchanged January 19th. The X-ray plate showed the one position of the foreign body with the two extreme positions of the eyes. This tended to prove, as Dr. Jackson stated, that the foreign body was in the orbit. The movement or change of position when the magnet was used also confirmed this.

DISCUSSION.—Dr. W. C. Bane said he recently had a case of foreign body in the vitreous. The X-ray showed this was 15 mm. back of the cornea. There were no movement of the sideroscopic needle when used. An incision was made at the temporal side of the cornea and the tip of the hand magnet was passed into the vitreous chamber, but was unsuccessful both the first and second time. The third attempt removed the foreign body. The lens was cataractous, but the patient has light perception with good projection.

Dr. Crisp said, in speaking of the X-ray plate presented by Dr. Spencer, that it looked as if two heads were on the one plate. He thought the child must have moved his head between the two exposures.

Dr. Spencer said these two exposures on one plate made it look as if the head had been moved, but he was very positive the head had not been moved. The oblique exposure accounts for this.

Dr. McCaw said he had had a case with an inflamed eye. The roentgenologist located the steel back of the eye. Dr. Jackson saw this case in consultation and advised that the foreign body be let alone.

Dr. Walker said he had a similar case.

The X-ray showed the foreign body back of the eye. He advised to let it alone.

Dr. W. F. Matson said a patient of his was X-rayed for a .22 bullet. The bullet was shown in the orbit against the lacrimal bone, when he received the report from the roentgenologist. The eye was enucleated and the bullet found at the apex of the orbit.

Dr. C. A. Ringle said a case of his had a piece of plow share in the brain cavity, according to the X-ray. This patient was seen by Dr. Walker. However, it was removed with a good result.

Dr. Jackson said if this were his patient he would wait, as all things point to the location of the foreign body in the orbit.

Iritis Due to Tooth Abscess.

DR. F. R. SPENCER presented B. F. C., age 43, first examined December 30th, 1917. O. S.: Cornea steamy, but not anesthetic; all media hazy; pupil 3 mm. immobile (atrop.); T. 8-11 mm. (Grapple tonometer); pain, photophobia, lacrimation, and marked pericorneal injection. V. O. D. was 6/6 and V. O. S. hand movements. Blood Wassermann 1+. X-ray of teeth by Dr. C. A. Monroe revealed one root abscess of left first upper bicuspid, and three impacted third molars. All were extracted by Dr. T. E. Carmody, December 31st. O. S. much better January 1, and has rapidly improved. Nose and throat examination negative. Dionin and atropin locally. Sweat baths. January 19, V. O. D. was 6/6 and V. O. S. 6/15-2. At the time of completing these minutes, March 2nd, 1918, V. O. U. 6/5.

DISCUSSION.—Dr. Crisp said one recent journal reported 55 cases in which a tooth abscess was responsible for the iritis, and the tooth was on the same side as the inflamed eye in 51 of these. He stated that dentists have determined streptococci to be present in many unfilled root canals; and that such teeth are dangerous, as they are likely to become active foci of infection at any time.

Dr. D. H. Coover said he had a keratitis case with five tooth abscesses. The cornea was very anesthetic, although it was not so since the eye had improved.

He also spoke of his personal experience with "gout," which was cured promptly and apparently permanently by the removal of a diseased tooth.

Dr. Melville Black said in cases of keratitis the teeth on the same side are very frequently involved. A patient with artificial teeth may have roots left in place, and we should be on the alert for this condition, especially as we can only detect these by means of X-rays.

Dr. Jackson had seen recently a case of herpes zoster ophthalmicus which was under the care of Dr. G. A. Moleen. The patient had some very bad teeth. He had herpes zoster last August, and after this there had been ptosis of one eye. The movements of the eye, however, were good. Vision had been reduced one-half by corneal haze. There was a tension of 55 mg. He said this etiology for herpes zoster ophthalmicus was rather new.

Dr. Walker said we do not hear of herpes zoster being repeated on the same side, and he doubted if there were any connection between the teeth and the attack of herpes. If there were, he believed these attacks would have been repeated.

Dr. Boyd said the first attack, in all probability conferred immunity.

Dr. D. G. Monaghan said he had one case in which the eye pain was due to impacted third molars.

Dr. D. A. Strickler reported a case of iritis in which there had been three recurrences. The teeth were X-rayed. Three upper right teeth were diseased and removed. O. D. was the only eye inflamed. The Wassermann was 4+.

Malingering.

Dr. W. H. CRISP reported a case of malingering in a girl of 12, who had been in the juvenile court. The mother was a Christian Scientist. The eye looked negative. The child said she did not have any light perception. She did not blink when the eye was apparently to be struck by the hand, until the fingers touched the lashes. The pupil reacted normally to light. This child had been in a street quarrel a few days before with a neighbor's boy, and the boy had slapped her on the side of the face. However,

the eye was not struck. By tests for malingering she read 6/7.5.

DISCUSSION.—Dr. W. F. Matson saw the case early. The mother wouldn't permit drops to be used, to determine whether or not the child had been taught to malingering.

Dr. Walker saw the case, too. The mother wanted a certificate of blindness for the juvenile court, but the case was dismissed by Dr. Walker.

Abscess of Caruncle.

Dr. W. H. CRISP reported a case of a young lady, 21, who had a mild conjunctivitis and later an abscess of the right caruncle. Four months later she had conjunctivitis of the left eye and an abscess of the left caruncle. Optochin was used for each eye. A free incision was made in each caruncle with a cataract knife and the typical furuncle core was removed.

Circumscribed Tuberculous Retino-choroiditis.

Dr. H. M. THOMPSON reported the following: On January 16th, a 17 year old school girl, from a distant town, was brought in for examination because of a cloud before O. S. This condition was first noticed some five weeks previous while attending church. The patient, an only child, of an asthmatic father and healthy mother, was an active and bright girl who had been doing unusually well in school, and in addition attending many social obligations, without apparently any bad effect on her health. The parents considered the girl well, but not particularly strong.

A physical examination revealed no definite trouble. The urine and Wassermann were negative. The blood count showed 4,568,000 red corpuscles, 14,000 white cells and an increase in both lymphocytes, the mature being 18 and immature 20. The hemoglobin showed 100 with Sahli instrument. Von Pirquet's test was positive. On two occasions, a slight afternoon temperature was found. V. O. D. 20/15, V. O. S. 20/200. The field of the left eye showed a large scotoma on the nasal side.

A lesion of a bluish gray color, about

2½ times the size of the disc, the greater diameter being in the perpendicular, was seen extending from near the temporal side of the disc to the macular region. The margins could be definitely outlined. The inner half of the area showed a tendency to a gray white patch, merging into a slightly darker color as it approached the macula. Extending towards the latter, from the circumscribed edematous area, was seen a patch similar in form to a magnified Purkinje cell, with a red nucleus, the tail, as it were, extending into the macula. This central spot was probably a minute hemorrhage. The vessels ran to the edge of this lesion and promptly disappeared in the swollen retina. The whole area of involvement was free from vascularity and pigmentation. The fundus otherwise was not abnormal in appearance with the exception that the outlines of the disc were somewhat hazy."

The factors that occurred to Dr. Thompson, which are an aid to the diagnosis, include the general makeup of the patient. A young girl with clear skin, beautiful coloring, which readily changes, a precocious mind, nervous temperament and very ambitious, who is physically below par. There was a tendency to afternoon temperature; the blood showed an increase of lymphocytes; and the von Pirquet was slightly positive. The lesion in the eye was independent of any change in the rest of the fundus. The absence of pigment, the color, edema and the apparently beginning atrophy of the choroid, added to the above, make up a picture that apparently can only be classified as of tuberculous origin.

FRANK R. SPENCER,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

February 18, 1918.

President, DR. HEMAN H. BROWN.

Some Remarks Concerning the Smith-Indian Intracapsular Operation for Cataract.

DR. FRANK ALLPORT read a paper on

this subject in which he stated that the most important phase of the cataract subject before ophthalmologists at the present time is what is popularly known as the Smith-Indian operation, as performed by Major Smith and modified by many surgeons of less experience. This procedure consists in the removal of the lens in its capsule after the method proposed by Major Smith, and when successful, produces brilliant and ideal results.

The only question for American ophthalmologists to decide is, whether this operation is the best one to perform. He would not attempt to speak for others, but personally he does not feel justified in adopting this operation in his own practice. If he could get the average percentage of good results by safer methods for his patients, who come to him for vision, and not for experimental surgery, it is his duty to give them the best that is in him, and he was sure this would not be the case if he began doing the Smith operation. He is perfectly willing to acknowledge that Major Smith and a few other East Indian operators of enormous experience, who do many of these operations daily, can do them successfully and achieve a large majority of brilliant results. He concedes this, although he contends that statistical results of all these operations might not be as convincing as the intracapsular operators desire. These poor blind people make cataract pilgrimages to the Smith shrine, are operated, and then return as quickly as possible to their distant native hills and are never seen or heard from again, thus rendering the collection of accurate ultimate statistics impossible. For this reason, we may never know what all the end results are of this much extolled surgical procedure. Smith's patients in India were tractable, patient, obedient people, unpoisoned by stimulants and excessive and rich food. Quick healing and slight reaction should be the rule under these circumstances. Should Smith, however, come to America, he would be confronted by an entirely different class of patients. He would operate on a large number of unmanageable,

impatient, nervous, disobedient, opinionated people, accustomed to servility from others, whose bodies have grown fat, flabby and diseased by laziness, gluttony, drink, autointoxication, syphilis and so on, and with whom slow healing and considerable reaction might be reasonably expected. If this is true, then those operators of less experience than Smith will surely get even poorer results than he would. On account of his natural skill and immense and unprecedented experience, Smith has acquired a skill and dexterity unequaled by any living man. He could do things no one else could do; he could meet emergencies better than any cataract operator in the world.

The greatest good to the greatest number should be the motto of all cataract operators, and the speaker is sure that this result cannot be attained in this country by using the Smith-Indian operation. Some intracapsular operation may be, and he believes will be devised, that will be suitable for average operators, but the Smith-Indian operation is not the one. Some claim that this operation is not so difficult after all, but the speaker is confident that only a few over zealous disciples entertain such optimistic views. The fact is, it is a complicated, difficult and dangerous surgical procedure, except in the hands of a few men like Smith and other East Indian surgeons, and even their hands might lose their cunning unless they were kept in constant practice.

The author believes that men in this country, who only operate a few cases a year, should not unnecessarily risk vision and the happiness of those patients who confide themselves to their care, because they, for one reason or another, are determined to risk the Smith-Indian procedure. The speaker thinks, therefore, rather than attempt this brilliant procedure, which he believes should only be used under favorable circumstances by exceptionally expert and experienced surgeons, that we might be better occupied in perfecting the quite satisfactory operation with which we are already familiar, and in reaching out along more con-

servative lines for the future intracapsular operation.

DISCUSSION.—Dr. Willis O. Nance expressed the belief that the Smith-Indian operation would never become the popular operation for cataract. The operation requires a special training and a special technic, that comparatively few ophthalmologists can ever attain. It has always seemed to him to be a much more difficult operation than the old von Graefe procedure. The speaker felt that pressure exerted on the eyeball, as is necessary in the Indian operation, was an element that should be avoided as much as possible in the ideal cataract operation. The Smith incision is not safe as is the old operation, in which the incision is carried beyond the limbus with a conjunctival flap. He could not see how the incision, made well into the cornea, could help but be responsible for the creation of astigmatism, although he has seen some published reports to the effect that astigmatism is no greater in the new operation than in the old. The incision, in his opinion, must necessarily be more liable to infection than the limbus incision.

The dressing advised by Smith has never met with Dr. Nance's approval. He has never been able to bring himself to the belief that the bandaging of the eye, upon which an operation has been done, should be left ten days without an inspection of the eye.

The technic of the Smith operation is a more or less delicate one, and must be learned carefully and practiced many times, if good results are to be obtained.

There is of course an advantage in operating in some cases of immature cataract, but the speaker, personally, would prefer to wait until the lens had become opaque.

Dr. Nance prefers to adhere to the capsulotomy operation rather than to adopt the Smith-Indian procedure. If he had the opportunity to do one hundred or more of these operations, at the hands of Smith, he might feel entirely different about it, but few surgeons receive that training, and until we do precaution and safety would naturally in-

dicating the employment of the older method.

Dr. G. Henry Mundt stated that he understood the essayist to say that in satisfactory cases the intracapsular cataract operation was probably better than the old capsulotomy operation. This the speaker granted. Dr. Allport, however, has placed the proposition in a way to show that the intracapsular cataract operation could not be done satisfactorily by the average operator, with which he did not agree.

Referring to the average operator, the speaker saw no reason why the average operator, unless he was thoroughly satisfied with the operative procedure that he was doing, could not develop intracapsular cataract technic as well as he could develop capsulotomy technic.

As to the amount of pressure necessary to produce collapse of the globe, if the operation was done properly sufficient pressure would not be exerted to produce collapse of the globe. If the lids were properly held, he did not believe the proportion of extruded vitreous would be as great with the intracapsular cataract operation as it would be with the old capsulotomy. If a man once mastered the technic of the intracapsular cataract operation he would be satisfied with it.

As to the proportion of astigmatism in the corneal incision, he did not believe it was any greater from the intracapsular cataract operation than it was from capsulotomy.

With reference to the length of time to leave the bandage on, this was a detail which he believed was a good one. The trend of surgery today was to leave bandages on longer than was done a few years ago.

Finally, the intracapsular cataract operation was no more experimental surgery to the average operator than was the capsulotomy operation.

Dr. H. W. Woodruff showed a case in which a cataract operation had been performed in both eyes. In itself there was nothing especially remarkable; but in connection with Dr. Allport's paper it served to demonstrate an important point. One eye was operated

on for cataract by simple extraction five weeks ago, and the other eye had the intracapsular operation performed on it three weeks ago. The visual results were the same in each eye at this time—20/30 with lens correction. The reason the intracapsular operation was performed on the second eye was because the lens was hypermature; the capsule refused to be cut, and the lens came out in the capsule. Iridectomy was done because the lens would not readily come through the pupil without that operation. In other words, it was an operation of necessity, while the first one was an operation of choice. The point to be emphasized is that there is no single method which should always be performed in every case of cataract.

He believes that the intracapsular operation may be one of necessity, while the simple extracapsular operation should be in selected cases the one of choice. He thought ophthalmologists made a mistake in attempting to prove that one method is the proper method in all cases of cataract. He believed that ophthalmologists had learned a great deal from the exploitation of the Smith operation. There had been times when he thought he should do that operation, but as he was so much more familiar with the ordinary operation he had confined himself very largely to it, and furthermore, it was so difficult to change one's technic that he had so far, excepting in very few cases, not gone over to this operation. In a person of middle life, say fifty years of age, in a physician, who was unfortunate enough to develop cataracts, one of them mature and the other one still immature, so that he was still able to attend to his routine work and was in perfect physical condition except for these cataracts, he would consider it a shame to cut out a piece of that man's iris, unless it was absolutely necessary. The visual results might be perfect (20/20) following the intracapsular operation, but when such a person went out into the sunlight he would have difficulty in recognizing objects quickly. He would not have the quick acute vision that

the man would who had a perfectly good pupil. He had noticed this about cataract patients, that while their vision may be 20/20 when tested, still it took them some time to quickly recognize objects. When one operated on a brother medical man in active practice he felt that that man was entitled to absolutely the best that one could possibly give him, and personally he knew he would appreciate very much retaining the sphincter muscle of the iris. So unless it was absolutely necessary, he would not do such an operation on such an eye which would involve the cutting of the iris. However, if he knew that the lens was hypermature, then the intracapsular operation was the better operation because there would be difficulty in removing the lens from the capsule.

Something had been said in the discussion about the use of retractors in holding the lids. This was one thing about the Smith operation that the speaker did not like. He would admit it was probably only a personal objection on his part and perhaps of not great value; nevertheless, it had always seemed to him as if the assistant holding the lids was in the way, and when he got ready to operate he felt like brushing them all aside and getting at the eye alone. He felt that he did not want any one else to touch the eye or to touch the lid. He felt absolutely safe in the average case if he had good anesthesia. It was so long since he had seen the loss of vitreous in an otherwise normal eye by the patient squeezing his lids that he did not feel at all afraid of that, if he knew his anesthetic was working properly. He had gotten so, that in many cases he used a 10% solution of cocaine, and in the case he had shown tonight there was absolutely no movement of the patient in either operation. The capsule was still present in the left eye, but it was only capsule. There was no lens substance in there, so that nothing was to be feared from the needling operation. This was the only reason why the Smith operation was ever done, namely, to do away with the capsule

as well as the lens. The needling was not serious at all unless one had a great deal of cortical substance and one only had that in the immature cataracts. That was another time when the Smith operation or the intracapsular operation was worth while considering.

Dr. Clarence Loeb stated that in conversation with one of the foremost advocates of the Smith operation, he had been told that one great advantage of this operation over the old style operation was in being able to get a clear pupil. Although he had operated on over 200 cases of cataract by the old method, he did not feel justified in saying that this method would always produce a clear pupil. However, he, himself, had had less than two per cent of secondary cataract. By making an incision well below the pupillary margin, and away to one side, drawing it all the way across parallel to the inferior margin of the lens, and bringing it back across the face of the cataract, attempting to joint the two incisions if possible, subsequently keeping the pupil dilated with atropin, at the end of four to six weeks the capsule was almost invariably retracted upward and filled out the coloboma, and by so doing he was enabled to get a clear pupil without the Smith operation. He had done the Smith operation in four cases and did so without ever having seen a cataract operation of that character done by the man who has been performing it, but simply from what he had read about it. In the first two operations the result was perfect. The result of the second operation was very good, and the third operation resulted in the loss of the eye from a low grade iridocyclitis. The lower margin of the pupil was always drawn well up beyond the center of the cornea, so that the process of light entering the eye was undoubtedly interfered with. For that reason he went back to the old method of von Graefe for the extraction of the cataract. He did not believe that the Smith operation was any more difficult than was the von Graefe.

Following his first operation the next day he noticed the surroundings of the

eye of the patient, so far as he could tell beyond the limits of the bandage, were swollen, and in taking off the bandage to see the condition of the eye he found enormous swelling; both the lids were so swollen that it was impossible for the patient to open the eye. He had to open it by means of a retractor. He expected nothing else than a beginning or far advanced panophthalmitis, but to his surprise, beyond a fair degree of injection of the ocular conjunctiva, there was nothing to be seen. This edema in the course of three or four days disappeared entirely.

He would like to know if any member ever had such an intense edema following a cataract operation without any cause for it.

Dr. Oliver Tydings stated that if the remarks on this subject were confined alone to the Smith operation, he would not have any dispute with the essayist or the gentlemen who have discussed the paper. But if the technic could be extended, as it had been developed at the Chicago Eye, Ear, Nose and Throat College, he would say that it was infinitely safer and it was possible to do the old operation with that technic. Before the introduction of the Smith operation he had long since eliminated the speculum, regarding it as a dangerous weapon. He contended that the technic of the Smith operation was the easiest and safest and best, and if a man was going to continue to do the old operation, he should learn it if only for the purpose of using it when he got into trouble. With a lid retractor the operator was safe. However, one could take a nurse and train her to retract lids. The services of an expert for this purpose were not required. If one once mastered the Smith technic, he would never abandon it.

Dr. William A. Fisher said he was glad to know that the Smith operation was being discussed. The essayist and some of the men who had discussed the paper acknowledged that they had not had enough experience in the intracapsular operation to speak with authority. The speaker did not think that any one should undertake to re-

move a lens in capsule if he did not understand the technic. One could get experience in the Smith technic without going to India, because it was not so much experience that one should have in a cataract operation as it was that he should have experience in the complications that often occur during a cataract operation by any method.

The speaker exhibited an eye of a six weeks' old kitten in which the cornea was eleven millimeters in diameter, stating that the cornea was thin, like the human, and one, if ambitious, could get these eyes by the hundred. If the operator believed it would take a hundred operations to understand and master the technic, he could get that number, or two hundred, if necessary. He could practice the spoon and needle delivery, which should be mastered before the operation was attempted at all. Tension in this eye was the same as in the human eye.

He thought that if Col. Smith was present he would have felt flattered at the wonderful opinion the essayist expressed of his operation, and that he believed Smith was the only man that could do it right, but ninety per cent of the lenses extracted in northern India are extracted in the capsule and they were not extracted by oculists who occupied chairs in a university, but by general surgeons whom Smith had taught. He did not believe Col. Smith would expect everybody to agree with him, and the speaker said he certainly would not expect everybody to agree with him, but he believed there would be a different feeling regarding the Smith operation if the men would pay more attention to the technic and less to criticism of it.

The essayist stated that it was his opinion that operators in the U. S. A. who were removing lenses in capsule would not care to have their results published, but he surely knows that there are reliable intracapsular statistics which could be readily obtained, with a comparison of other methods.

The speaker then presented the following intracapsular statistics regarding vitreous loss:

	No. of operations.	Vitreous loss.
Smith, 1904....	2,616	6.76%
A. Knapp, 1908	104	11.5%
Vail, 1912.....	358	2.2%
Clark, 1912....	245	4%
Meding, 1912..	325	10%
Shepard, 1912..	650	5.2%
Smith, 1913....	150	2%
Fisher, 1914....	576	7%
Total	5,022	6.37

VISUAL RESULTS FROM CAPSULOTOMY METHOD.

H. Knapp, 1,000 cases, 20/40 or better, 52%.

Duncan, 100 cases, 20/40 or better, 69%.

Webster, 100 cases, 20/40 or better, 57%.

Weeks, 100 cases, 20/40 or better, 7.8 or 54.5%.

INTRACAPSULAR RESULTS.

A. Knapp, 100 consecutive cases 20/40 or better, 70%.

D. W. Greene, 203 consecutive cases, 20/40 or better, 72%.

A. S. Greene, 109 consecutive cases, 20/40 or better, 86.2%.

Fisher, 94 consecutive cases, 20/40 or better, 74%.

Meding, 83 consecutive cases, 20/40 or better, 73%.

Total, 589 consecutive cases.

Vision 20/40 or better, capsulotomy method, 54%.

Vision 20/40 or better, intracapsular method, 73%.

Dr. Fisher exhibited at the Chicago Ophthalmological Society, January, 1915, 12 cases. There were ten patients with average vision of 20/25; no losses. Smith in 1912 reported 132 selected cases operated by him personally with vision of 20/40 and better 100%. Gidney reported 100 patients, both eyes operated, one eye intracapsular, and the other capsulotomy.

Intracapsular cases, 100 20/40 or better, 54%.

Capsulotomy, 100, 20/40 or better, 18%.

From the above statistics it would seem that ophthalmic surgeons who are operating by the intracapsular

method cannot be expected to abandon it and return to the capsulotomy method just because some operators who are unfamiliar with the technic choose to condemn it.

Dr. Allport, in closing, stated that he firmly adhered to what he had said, in spite of the remarks of Dr. Fisher and others concerning the ease with which the Smith-Indian operation can be performed. He cannot agree with these gentlemen that it is safer than the operations usually performed in this country. He believes it to be a much more difficult and hazardous procedure than the ordinary operation, and one that should only be indulged in by those of superior surgical skill, special clinical education and an extensive cataract practice. He would like to ask Dr. Fisher and others why they felt it necessary to travel to India for instruction if this operation is so simple? He still contends that this procedure is not adapted to the average American operator, with an average cataract practice.

ANGIOMA OF THE ORBIT.

DR. GEORGE W. BOOT reported the following case: I saw this girl first about the middle of December. She is a German, 21 years of age, and single. She gave no history of accident or previous illness. She first noticed trouble with her eye about eight or nine months ago, at which time it was bloodshot and somewhat swollen. This condition has gradually grown worse. As you see, she has a soft swelling at the inner part of the orbit; the upper eyelid is swollen; there are large tortuous vessels crossing it, and the trouble has distinctly increased since I saw her in December, when I felt a swelling, and noticed a thrill with it and in listening with the stethoscope I heard a bruit over the whole face. There are no lesions inside the nose. I thought possibly this growth might extend into the nose, but the nose is normal. I had stereoscopic X-ray pictures taken, but there was no sign of erosion of the bone.

The question of diagnosis came up, and I believe this is a hemangioma. I find that hemangiomas are mentioned

in practically all textbooks, and ordinarily they are classified under three different forms, the capillary nevus or the so-called port wine marks, cavernous angioma, and plexiform angioma. Fuchs says angioma of the orbit is rare, but Axenfeld says it is not so rare. I have looked over the *Index Medicus* for the last five or six years and have only found five cases recorded, so that the condition probably is quite rare.

Angioma is very apt to be mixed with other forms of tumor, such as angiosarcoma, or myxangioma, or fibroangioma, or angiofibroma, depending upon the kind of tissue the tumor is made up of.

The symptoms as given for this condition are usually, first, exophthalmos. The patient notices that the eye is more prominent than usual. In this case exophthalmos is well developed. This condition lasts for a considerable length of time ordinarily, and then swelling is noticed outside of the eyeball. In this case it is seen alongside of the nose. This swelling is apt to be somewhat bluish in color, soft, not painful, and it can be made to disappear by pressure, but returns again when pressure is removed. Norris and Oliver say that these angiomas are not accompanied by bruit or thrill. Ball says they are usually accompanied by bruit or thrill. This case is accompanied by bruit.

Roemer mentions varicose veins of the orbit, but the cause of the varicose veins is not given.

The capillary form of angioma is congenital, or it appears shortly after birth. The cavernous form and plexiform form of the trouble develop later in life. Varicose veins develop still later. In some forms the angiomas are encapsulated.

As to treatment advocated, when the growth is encapsulated excision by means of the knife is perhaps the best method. Most authors apparently would recommend electrolysis for angioma.

In the *American Encyclopedia of Ophthalmology* I find a report of one case in which a man used absolute alcohol for angioma through the con-

junctival surface of the lid. He injected three drops, then later six drops, and repeated six drops on two other occasions, with the result that the angioma completely disappeared. In this patient I had contemplated the use of electrolysis, but the growth has increased since I saw her last and it extends out to the side of the nose and over to the other side of the face, so that I doubt whether electrolysis would be advisable in this case.

Among the dangers connected with this trouble are septic thrombophlebitis, and that is particularly apt to follow electrolysis. I would be afraid to use electrolysis in this case on account of the possibility of embolism. I am in doubt as to what should be done. Ligation of the carotid would probably help, but in the few cases I have been able to get track of where that has been done, the results have not been permanent because of the collateral circulation which is established.

If any of the members have had an experience of this sort I should like to hear it.

DISCUSSION.—DR. OSCAR DODD saw this case when Dr. Boot presented it at the Evanston Branch of the Chicago Medical Society in December. There was quite a change in the appearance of the condition since that time, there being considerable extension of the swelling above the nose at the inner angle of the orbit; also enlargement of the veins at the outer margin of the orbit, but the proptosis was no more than at that time. At present the bruit was much more marked and pulsation could be felt all about the orbit as it could not be at the time he first saw the patient.

The diagnosis in this case was rather difficult. He thought it was an angioma when he first saw the case in December. However, he questioned this diagnosis tonight for the reason of the greater distention of the veins and the distinct pulsation which was present. By pressure over the carotid the pulsation and distention of the veins was markedly lessened and one could see the recession of the eye. It looked to him as though there was a probable connection between the artery and the

vein, and that this was a typical pulsating exophthalmus. In contradistinction to this we might have an angioma with distension to which the pulsation was communicated from the artery.

As to treatment, the ligation of the carotid was the first thing that should be done in this case. He did not know whether that would be sufficient to cure or not, but it would at least relieve the pressure and make it safer for further operation should such be necessary. Unless something was done, it looked as though the case would go to disastrous results.

DR. OLIVER TYDINGS stated that while he had never seen a case of the kind described, yet in connection with it he would like to relate a case that he observed many years ago. In that case one could hear a bruit across the room. There was no external appearance at all. He had the late Dr. Francis T. Miles, neurologist, and professor of anatomy at that time in the University of Maryland, see the case, and he put it down as a tubercular condition of the meninges that produced the bruit and cautioned him very carefully to have a postmortem made. But the patient would not die; he could not get the postmortem. The last time he saw the man was ten years ago and he understood he was still living and well. The case was exceedingly interesting, in that the patient got well without any trouble and without any treatment. If he were going to do anything in an operative way on the case Dr. Boot had reported, he would either use hot water or something that he had seen mentioned lately, namely, the use of quin and urea for the purpose of producing obliteration of the aneurysmal varix.

DR. BOOT, in closing the discussion, said that he had neglected to say in his previous remarks that there were no particular changes in the fundus. The veins were somewhat engorged, but this was about all. He had considered the possibility of arteriovenous aneurysm, but the absence for any cause of such aneurysm led him to think that it could hardly be that.

PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA—JOINT MEETING WITH SECTION ON OTO-LARYNGOLOGY.

December 7, 1917.

DR. S. LEWIS ZIEGLER, Acting Chairman.

Intracranial Complications of Aural Diseases in Relation to Ophthalmology.

DR. S. MACCUEEN SMITH said that ocular manifestations are frequently unreliable on account of their absence in most rapidly progressing cases, sufficient time for their development not elapsing between the onset of the disease and its fatal termination. Optic neuritis, while a fairly constant symptom, is mainly due to intracranial pressure, and therefore not characteristic, necessarily, of aural diseases and their complications alone, but may also be found in brain tumor, etc.

Ocular symptoms would seem to offer definite indications that the aural disease has involved tissues within the cranial walls, this being about the limit of their significance. The absence of ocular symptoms, on the other hand, does not exclude the presence of intracranial suppuration. Given other characteristic symptoms, a negative ophthalmoscopic examination has absolutely no significance. Optic neuritis in sinus thrombosis occurs too late to be of early diagnostic value, but will be present in about 50 per cent of the more advanced cases.

In brain abscess there are no intra-ocular symptoms that define its location. Symptoms which indicate the presence of this lesion, but not its location, are photophobia, external strabismus due to pressure on the motor oculi, or nystagmus and dilated pupils if the abscess is large; while if small, the pupils are small and sluggish. This being true, neuritis occurs late when pressure is exerted thru abscess in the temporo-sphenoidal lobe, but is earlier in development and more constant in abscess of the cerebellum.

In temporosphenoidal abscess of the left side, aphasia is present, as well as optic amnesia and optic neuritis if the abscess is sufficiently large to produce pressure. In cerebellar abscess, nystagmus is common and optic neuritis is more constant than in temporosphenoidal abscess. Nystagmus will usually be found directed toward the affected side, becoming more marked as the disease progresses.

Cerebral irritation is a prominent symptom during the initial stage of meningitis; also photophobia and contraction of pupils. Later, as compression symptoms develop, the pupils react sluggishly and finally become dilated, often unequal, and may be firmly fixed. At this late stage symptoms of cerebral paralysis become increasingly marked, together with ptosis, strabismus, nystagmus or conjugate deviation. Diplopia has been such a constant and marked symptom in the writer's personal experience that he looks upon it as being of considerable importance, and he is always suspicious of a developing meningitis when a patient suffering from aural disease complains of a progressive intolerance to light.

DISCUSSION.—Dr. Howard F. Hansell said: Diseases of the eyes in their relation to diseases of the ear as a subject of study had received scant attention until the importance of the tests for balance or equilibrium became manifest. The status developed by the Bárány test, both physiologic and pathologic, of the relation between the ear and the eye is striking and impressive. Without indicating disease of either organ in the subject of the test it demonstrates the presence or absence of a lesion of the connecting fibers or the cortex of the brain, its location and its approximate size—a long step forward in the diagnosis of intracranial affections.

Papillitis and muscular paralysis are the usual ocular complications of otitic meningitis, the former due to involvement of the sheath of the optic nerve, and secondarily the nerve itself, by direct extension of the inflammation and the latter to pressure by the products

of the inflammation on the sixth, fourth and third nerve, in the order given, in their course at the base or at the entrance into the orbit.

A second class of cases of ocular involvement include those in which a clot or thrombus originating in otitic inflammation lodges in the lateral or cavernous sinus. The optic disk is covered by exudation and hemorrhages. The retinal veins are enormously dilated and tortuous and the retina infiltrated by numerous deep and superficial hemorrhages. Diseases of the ear and temporal bone are responsible for two-thirds of the cases by reason of direct contact, by meningitis and by brain tuberculosis.

Another set of cases are those in which labyrinthine disease is the cause of some forms of nystagmus exclusive of nystagmus of miners or of opacities in the media. Bárány has clearly shown that physiologic nystagmus is created by a current in the horizontal canals. His tests have led to the knowledge that diseases of the labyrinth, or of that part of the brain connecting the labyrinth with the nuclei of the external eye muscles, becomes the cause for the nystagmus.

That diseases of the eye may produce organic changes in the ear leading to deafness has not been established. The only indication that such a connection may possibly exist is the deafness associated with sympathetic ophthalmia. It has been suggested that this reflex movement has its origin from unusual impulses arising from the labyrinth.

Transmission of disease from the ear to the eye is always serious and often fatal because of the complex channel of communication. It is never direct or immediate as is the case in extension of disease from the sinuses adjacent to the orbit. The germ or exciting cause travels through veins or lymph canals, through the membranes or tissues of the brain and seldom through continuity of structure. Therefore, ocular complications may be referred to cerebral rather than to otitic causes.

Ocular Signs and Symptoms Associated with Intranasal Lesions.

Dr. S. Lewis Ziegler stated that

only within recent years had the interrelations of ocular and nasal lesions been accepted as important factors in the evolution of modern medicine. He considered it important that the rhinologist and ophthalmologist should join hands in a coöperative effort to recognize and correct these obscure lesions. The transmission of disease may occur thru direct infection, thru the toxins of suppuration, thru continuity of tissue, thru edema from pressure in the orbit and thru lymphoneuroses which are purely reflex.

Dr. Ziegler reviewed in some detail the affections of the orbit, ocular pareses, optic nerve lesions, intraocular manifestations, lacrimonasal disease, headache and reflex neuroses which arise from intranasal and accessory sinus disease. The reflex neuroses arising from intranasal lesions were of special interest to the writer and he thought the three most active etiologic factors were: (1) Pressure contact, (2) hyperesthesia and (3) nasal obstruction.

Dr. Ziegler thought that the most interesting part of this whole problem was the study of these reflex manifestations and concluded by asking, "Why should intranasal pressure originate a severe bulbar or supraorbital neuralgia? Why should sinus disease cause a fugitive edema and ecchymosis of the upper lid as in a case related by de Schweinitz? Why should boggy contact pressure in the nose of an undernourished child cause blepharospasm, photophobia, corneal ulcer, scalp sweating and universal skin leakage? Or in such a case why can we reverse the reflex by opening the child's eyes, and thus cause it to sneeze? Why does a nonsuppurative nasal lesion cause choroiditis, as improvement through nasal treatment has demonstrated? Or why, as in Dunn's case, does a chronic choroiditis recover when a shrunken fibroid appendix is removed? In other words, will not a careful study of the chemistry of metabolism show us how a terminal sympathetic filament controls a local lymph secretion, whether it be pathologic from a normal reflex or pathologic from a perverted reflex. Would we not therefore gain much

profitable information by a closer study of lymphoneuroses originated by reflex impulses?"

Ocular Lesions the Result of Oral and Pharyngeal Diseases.

This paper by Dr. William Zentmayer has been published in full, page 247.

DISCUSSION.—Dr. Charles P. Grayson thought that Dr. Zentmayer had displayed a great deal of both discrimination and industry in the preparation of his paper. The field that he covered is one of comparatively recent opening, yet he has combed the literature so critically and thoroughly that his paper is one of exceptional clinical interest. It seems to Dr. Grayson still questionable whether any pathologic condition within the mouth or nasopharynx can exert a direct disturbing influence upon the eye. None of course, doubt that the focal infections so frequently traced to the teeth and tonsils can occasion such serious systemic disorder that the eyes may share in the general disturbance, but this is obviously indirect and is not at all analogous to an ocular injury that ensues, for instance, upon disease of the nasal accessory sinuses. If the eyes suffer at all from the general bacteremia occasioned by alveolar abscesses or cryptic suppuration of the tonsils, it is probably in most cases a late manifestation and has been preceded by a number of other lesions that have already directed attention to the source of trouble. If there be any direct pathologic connection between the mouth and oropharynx and the eye, it certainly has not yet been clearly demonstrated and Dr. Grayson is inclined to doubt that it will be.

Obstructive Lacrimonasal Disease and Its Treatment.

DR. E. B. GLEASON stated that the infection of the duct may occur either from the conjunctiva or the nasal mucous membrane and the reason why this does not happen more frequently is due to the small size of the puncta and the presence of the valve of Hasner. The nasal orifice of the duct is in

the suture of the inferior turbinate with the superior maxillary at the junction of the anterior fourth with the posterior three-fourths of the turbinate at the apex of a broad inverted V, the line of suture descending somewhat abruptly in front and more nearly horizontally behind; so that the valve of Hasner is easily located by passing a probe from behind forward beneath the inferior turbinate until the end of the probe sinks into the apex of the V described above. In the same way a tube may be inserted into the duct so as to cleanse it by injecting fluid from below through the duct, sac and puncta. The nasal orifice of the duct can be inspected in most instances by infracting the inferior turbinate with Sullivan's modification of Killian's speculum. This procedure is usually done to expose the nasal wall of the antrum so that a sufficient portion can be curetted away under direct vision to thoroly open the antrum. The procedure can be repeated at ordinary office visits as often as thought necessary without great reaction as far as the inferior turbinate is concerned.

The most annoying symptom in mild cases of catarrh of the duct is epiphora. Generally the obstruction to the flow of tears is either where the inferior canaliculus enters the sac or at the nasal orifice of the duct. If the obstruction is at the canaliculus, the treatment is astringent collyria, dilation or slitting open the canaliculus. When the obstruction is at the nasal orifice, the treatment is intranasal. Cases where epiphora occurs only when the patient is exposed to cold, yield to applications beneath the inferior turbinate body to the region about the nasal orifice of the duct of iodine—potassium iodide—glycerin or 10 per cent argyrol. Because of the close proximity of the wall of the nose and middle turbinate, there is sometimes a capillary attraction that retains the solutions in contact with the parts for a considerable time. Treatment should be directed when necessary to reducing the size of the inferior turbinate with scissors, snare or galvanocautery or changing its relation

to the nasal wall by infracting it toward the septum.

The more severe cases of infection of the sac with retention of pus with or without a fistula are not very satisfactory to treat. However, the majority of oculists seem to think that better results are obtained by passing probes, wearing styles, etc., than by intranasal operations. In one case seen by the writer ten or more years ago where there was complete bony occlusion of the nasal orifice of the duct and a fistula, he laid the fistula open into the sac and introduced a small nasal trephine into the sac as low down as possible and removed a small disk of tissue into the nose. He then turned into the nose through the opening a thin strip of skin from the lower lid and stitched up the wound. The operation was simple and easy and was reported a year or more afterward as having been successful in bringing about a cure of the fistula and relieving the epiphora.

Purulent dacryocystitis may progress to bony occlusion of the duct with fistula beneath the inner canthus. The conjunctiva may be infected from the pus, and ulcers form on the cornea; but although theoretically a suppurating sac is a focus of infection comparable to chronic alveolar abscess, suppurating tonsils, etc., the deeper structures of the eye are probably never infected from this source except through a wound.

DISCUSSION.—Dr. Posey said that the cause of a watery eye is not always intranasal, for it may depend upon a number of factors connected with the eye. Thus, increase in lacrimation is symptomatic of nearly all inflammatory conditions of the eye. Again, certain conformation of the skull which occasion abnormally small lacrimosal ducts predispose to it. Anything which interferes with the delicate suction-like action by which the tears are sucked up from the globe and conveyed into the lacrimonasal sac is also a causal factor. Certain innervational disturbances in the supply of the orbicular muscle and relaxation of the internal palpebral ligament, will occasion this.

Dr. Posey said his plan of procedure in the treatment of diseases of the excretory portion of the lacrimal apparatus is as follows: If there is simply increased lacrimation without any apparent local cause to occasion it, the punctum is dilated and the sac and duct washed out with a solution of boracic acid, zinc or alum. Stronger astringents are never used, on account of the danger of their escaping into the soft tissues of the orbit and causing orbital cellulitis. Dr. Posey referred to a case seen in the practice of another where vision was lost from orbital cellulitis occasioned by the escape of a solution of silver nitrate into the orbit during the act of syringing; inflammation of the optic nerve followed by atrophy resulting. If repeated syringing fails, he then introduces a style, as he does not think the repeated passage of probes is warranted, on account of the pain which this procedure gives rise to and the doubtful results. Care must be taken that the operator should conform the length of the style to the apparent length of the duct before operation, and the right-angled shank should be made to fit nicely into the divided canaliculus, to prevent subsequent healing and closure of this tubule and to provide for drainage. The style is removed at the end of three or four months. If lacrimation still persists, the extirpation of the sac is advised.

For Acute Dacryocystitis.—After the administration of a general anesthetic, gas in many instances, the lower canaliculus is emptied by pressure on the swollen lid, and a style inserted after the manner just described. This one operation gives exit to the pus, overcomes the stricture and provides drainage at the same time, and is much to be preferred to the old method of incising the sac from without and later overcoming the stricture by probing. He had operated on all his cases of acute dacryocystitis in adults by this plan for many years, and never had one untoward result.

For Lacrimal Stricture with Catarrhal Discharge.—Syringing with astringent washes and the instillation of a 1 or 2 per cent solution of ethylhydro-

cuprein into the conjunctival cul-de-sac several times daily was his usual procedure. The administration of the latter solution is in most cases purely empirical, and he had found it highly efficacious in many cases of catarrh of the sac in which pneumococci are not found. Failure after two or three weeks of this treatment is followed by extirpation of the sac.

Mucocele of the sac, with tightly enclosed contents. Extirpation of the sac is advised in all cases.

The indications for the removal of the sac have been given. The method employed was that outlined by Meller, and the success of the operation depends upon a strict adherence to his technic. The first essential is the control of pain and bleeding by a free use of novocain and adrenalin, nine parts of a 2 per cent solution of the former to one part of a 1 to 2,000 solution of the latter. The Pravaz syringe recommended by Meller is clumsy and provided with too large a needle. The ordinary hypodermic needle suffices. The contents of one barrel are emptied just under the skin, one half below and the other half above the canthal ligament. The contents of the second barrel are injected into the deeper tissues above and below the ligament. Care should be exercised to avoid injuring the walls of the sac with the needle.

After incising the superficial tissues, and parting the lips of the wound with Meller's speculum, the sharp teeth of which are replaced by dull ones, to avoid possible injury to the cornea in case of slipping, he searched carefully for the internal palpebral ligament, as the most valuable landmark in the operation. The ligament once found, the position of the sac just below it is readily ascertained, and it becomes a simple matter to divide the ligament and to separate the inner wall of the sac from the bony margin of the orbit by the points of a closed pair of scissors. More difficult is the separation of the outer wall of the sac, on account of the danger of getting into the orbital fat and obscuring the field of operation. After freeing the lateral portions of the sac, the sac is pulled forward by a stout

pair of forceps and the duct divided as far down in the canal as possible. The division of the apex of the sac is left until the last, as the few rapid cuts of the scissors necessary to accomplish this are often followed by considerable hemorrhage. After curetting the lacrimonasal duct, the lower canaliculus invariably should be slit up and curetted throughout its entire length, to destroy its mucous lining, and to obviate leaving any possible focus of infection. Healing is prompt, and in but one case, where a keloid overgrowth marred the cosmetic result, had there been any appreciable scarring. He had done the operation a great many times and found it one of the most satisfactory in eye surgery.

Dr. S. D. Risley said he had been deeply interested and instructed by the thoughtful papers presented in the symposium provided by the Committee. His own experience was quite in accord with most of the views which had been expressed both in the papers and the discussion; but he thought that additional emphasis should be given to two features, bearing, primarily, (1) upon the etiology of the group of affections under discussion and (2) upon their treatment. He thought that the importance of anatomic deformities in the anterior segment of the skull was often overlooked. Many years ago he had observed that frequent association of ocular defects with these variations in the form of the skull and had secured a large collection of hatters' forms for patients with high degrees of asymmetric astigmatism, and with muscular imbalance and had been impressed by the often grotesque shape of the head in these cases. Not only was the cranial dome distorted but there was great deviation in the face. A relatively flat or even concave zygoma on one side and a large convex one on the opposite side, and the eye on one side being nearer the median line of the face than on the other.

It is obvious that these deviations would affect the walls of the orbits and cause more or less variation in the location of the eye in the orbit and the form of the eyeballs and also of the

distribution of the extraocular muscles; not only in their origin at the apex but in their length, line of direction and their point of attachment to the eyeballs. He thought that these abnormal conditions were in a large measure responsible for the defects of refraction in the eye, thru a change in the diameters of the face, and also for many of the abnormalities of binocular balance. He had been impressed by their frequent association.

But not only were the orbits involved in these anatomic anomalies, but also the nasal fossae and the mucous-lined bony sinuses contiguous to the orbits, and the lacrimal duct, all of which drain into the nose and pharynx. Any change from their normal relations, is significant not alone for the reason that it may disturb their normal drainage, but renders them peculiarly liable to disturbance from any systemic disease affecting the mucous membranes. This was a second point which he wished to emphasize. The mucous membrane lining all these cavities in the anterior segment of the skull, the conjunctiva with its lacrimal drainage system, and the ear with its Eustachian tube should be included, are particularly susceptible to many systemic disorders. The ectoderm, he thought, seemed the first to disclose the presence of toxic, or infectious systemic states. A good illustration, he thought, was found in the so-called common cold, with the stuffed nose and ears, increased lacrimation, frontal pain and general malaise. The conjunctiva remained transparent but was edematous and the ophthalmoscope revealed a hazy fluffy fundus. The same conditions were often found after attacks of acute indigestion, or with prolonged or habitual constipation, as a result of the ensuing toxic conditions. There was probably present in all of these systemic conditions a general acidosis of the tissues; certainly professional experience had for many years approved the administrations of the alkaline earths as a therapeutic measure. He had so frequently seen this toxic syndrome clear up under alkaline treatment and attention to the alimentary

tract that he esteemed such measures as important before any radical operative interference was undertaken.

Dr. Holloway stated that he was very glad to hear Dr. Zentmayer make the statement he did in regard to dental infection. While he had no doubt these were all too frequently responsible for ocular conditions, we should not lose sight of the other etiologic factors in the present vogue for focal infections. Some years ago we went thru the cycle of accessory sinuses, then the ductless glands, and we are now in the cycle of dental infections. The fact that many of these symptoms or diseases that have been enumerated may be caused by a dozen different factors should lead to an exhaustive study of the patient. Not infrequently two or more affections have been found and the difficulty is to determine which is really the exciting cause.

Concerning the dacryocystitis cases, Dr. Holloway stated that he had very good results in using mercurophen as an irrigating fluid. Mercurophen is the new mercurial preparation made at the Dermatological Research Laboratories of the Polyclinic Hospital by Drs. Schamberg, Kolmer and Raiziss. The first case in which Dr. Holloway had had occasion to use this the dacryocystitis was associated with mature cataract. Pure pneumococcus cultures were recovered from the conjunctiva, but after slitting up the duct, free irrigation of the eyes and irrigation of the sac and duct with mercurophen, negative cultures were obtained at the end of a week. He had also obtained splendid results with this preparation in the treatment of acute conjunctivitis.

J. MILTON GRISCOM, M. D.
Clerk.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of February 5, 1918.

Infection After Cataract Operations.

DR. P. N. K. SCHWENK reported two cases of panophthalmitis with recovery following cataract extraction. The

first case, a woman, age 72, underwent a combined lens extraction at her home, on November 21st, 1917. The patient made an uneventful recovery, but there remained an opaque piece of capsule in the pupillary area. About a month later, a capsulotomy was performed, followed in twenty-four hours by severe pain, nausea, and edema of the bulbar and tarsal conjunctiva. The cornea was indurated at site of limbal puncture. Two days later, the anterior chamber was two-thirds full of a purulent exudation and the cornea was steamy. A 25 per cent solution of argyrol was instilled three times a day, atropin four times a day, and the eye was frequently cleansed with boric solution. Externally, to the lids, a warm 50 per cent solution of magnesium sulphate was applied for fifteen minutes every two hours, for six weeks. Internally, 2 grs. quinin were administered four times daily. At the end of three weeks, the corneal induration began to subside and the hypopyon had nearly disappeared. At the end of the sixth week, the sclera was white and the cornea clear except for a minute scar at the site of former puncture. Today there remains some organized lymph in one portion of the pupillary area, but the corrected vision is 6/30. Dr. Schwenk said that he had never seen, in his experience, such a violent inflammation followed by retention of the normal shape of the globe.

The second case, a woman, age 82, underwent a combined lens extraction on November 16th, 1917. Two days later the wound was healing nicely, the anterior chamber had reformed, and there was but slight reaction. Four days later, the aqueous was hazy, there was a small hypopyon, and more pronounced reaction. The case was then treated in a similar manner to the one above mentioned. Nine days the aqueous was clearing up. The pupillary coloboma space was filled with a whitish exudate. Ten days later, this exudate was absorbing. Eleven days later, the eye was entirely quiet and a capsulotomy was done. The following week, numerous vitreous exudates and

a faint fundus reflex was seen. Two weeks later, corrected vision was 6/30 and the patient was discharged.

DISCUSSION.—Dr. Zentmayer thought that the cases reported by Dr. Schwenk should not be classed as panophthalmitis, but rather as wound infection with iridocyclitis. Personally he had no faith in argyrol in these conditions and lately, in two cases of wound infection, he had used subconjunctival (intraorbital) injections of cyanid of mercury (1-3000); and had attributed the very satisfactory end result to this method of treatment. Possibly less radical methods would have proved as effective.

Dr. McCluney Radcliffe presented a case of panophthalmitis following cataract extraction, caused by tooth infection. He had performed a combined operation and recovery proceeded in a normal manner until the seventh day, when symptoms of infection were first noticed. (Before the operation was undertaken, a negative smear had been made from the contents of the conjunctival cul-de-sac.) With the onset of symptoms of infection, the usual treatment was instituted without effect. It was finally discovered that there was an infected tooth on the same side. An X-ray was taken and showed a diseased root. The tooth was then extracted. There was a large cavity in the lower portion of the crown and the root showed necrotic changes, but there was no abscess. The eye now shows a condition of phthisis bulbi and will have to be enucleated. Dr. Radcliffe thought that the onset of the disease seven days after the operation, when the anterior chamber was thoroughly closed, strongly indicated that the infection was of endogenous origin.

DISCUSSION.—Dr. Zentmayer said that he did not recall in literature a case of panophthalmitis attributed to focal infection. Most of the cases were uveitis. There were however several cases, similar to the one reported by Dr. Radcliffe, in which infection following operation had been attributed to oral sepsis.

Dr. Posey thought Dr. Radcliffe's conjecture regarding the origin of the

infection was correct. He thought, however, that ocular infection from dental causes was exaggerated. He had recently been compelled to operate upon a case with marked pyorrhea and had never had better results.

Corneal Opacity.

DR. POSEY reported a case of corneal haze in a miner. The haze, which was limited to the pupillary areas of both eyes, consisted of a grayish-white stippling of the anterior layers of the cornea, apparently due to a hyaline change. The remaining portions of the cornea were clear; vision equalled 5/15 in each eye. The patient was a laborer and had worked for 30 years at the openings of shafts, where he was subjected to violent drafts. The ocular changes here seen were probably caused by the action of air laden with small irritating particles of dust. Dr. Posey referred to an article written by Nettleship some years ago, in which that author referred to a number of cases of dimness of vision resulting from a haze of the corneal epithelium, occasioned by a high wind. He said that he had recently seen a similar case in his own practice in which a break in the epithelium, caused by the lodgment of a foreign body, was surrounded by a peculiar haze of the epithelium which was elevated as though infiltrated with oil droplets. This condition of affairs subsided in twelve hours.

DISCUSSION.—Dr. Zentmayer asked Dr. Posey how he explained the limitation of the opacity to the center of the cornea. In most similar conditions the opacity was zonular.

Dr. Schwenk considered that Dr. Posey's conclusion, that the corneal irritation was caused by wind laden with foreign matter, was quite reasonable.

Perforating Wound of Globe.

DR. POSEY showed a child who had suffered a perforating wound of the limbus. The iris had been prolapsed and the lens injured. As the case did not report at the hospital until 48 hours after the injury had occurred, he treated the case expectantly, especially

as there was some discharge from the conjunctiva. He thought it a mistake in cases of this kind to open up the wound after it had been once partially closed over with epithelium, on account of the danger of wound infection. As in this case, he preferred to wait until the inflammatory reaction and the conjunctival irritation had subsided. In this case he closed the wound by dissecting the conjunctiva from the ectatic area, and slipping the same underneath the undermined conjunctiva below the wound, just as is done in the McReynold pterygium operation. Such a procedure closes the wound, makes tension upon it and produces a flat scar.

Adenoma of Orbit.

DR. POSEY exhibited a case of a young girl, from whom he had recently removed an adenoma of the orbit. The cosmetic results were almost perfect, a slight drooping of the lower lid and a very fine scar over the outer marginal rim remaining. But three weeks had elapsed since the operation.

DISCUSSION.—Dr. Zentmayer said that he thought Dr. Posey had more than cured the exophthalmos, and that there was now a slight enophthalmus. The result, however, he considered to be excellent.

HAROLD W. HOW, M. D.,
Secretary.

BLUE CATARACT.

Y. KOYANAGI.

OSAKA, JAPAN.

Abstract of translation from the *Nippon Ganki Zasshi*, March, 1917, by N. Kunitomo, M. D., Denver, Colorado.

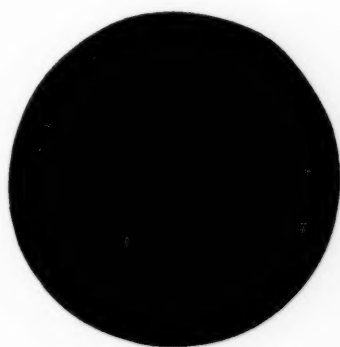
Opacity of the crystalline lens seen by oblique illumination commonly shows a grayish white color. By direct illumination with the ophthalmoscope, it appears dark against the red background of the pupil, the extent and form of the shadow depending on the amount and distribution of the opacity.

In certain cases, however, by oblique illumination a blue or greenish color is shown. The condition causing this appearance is known as "blue cataract" (*cataracta coerulea*), and in this condition ophthalmoscopic examination may show no interruption of the fundus reflex. The parts of the lens thus affected may take the form of a star or Y-shaped figure. More frequently they appear as dots in the periphery of the pupil, or only discoverable when the pupil has been dilated. These dots may be arranged in radiating lines or sectors, though such grouping is often not very evident.

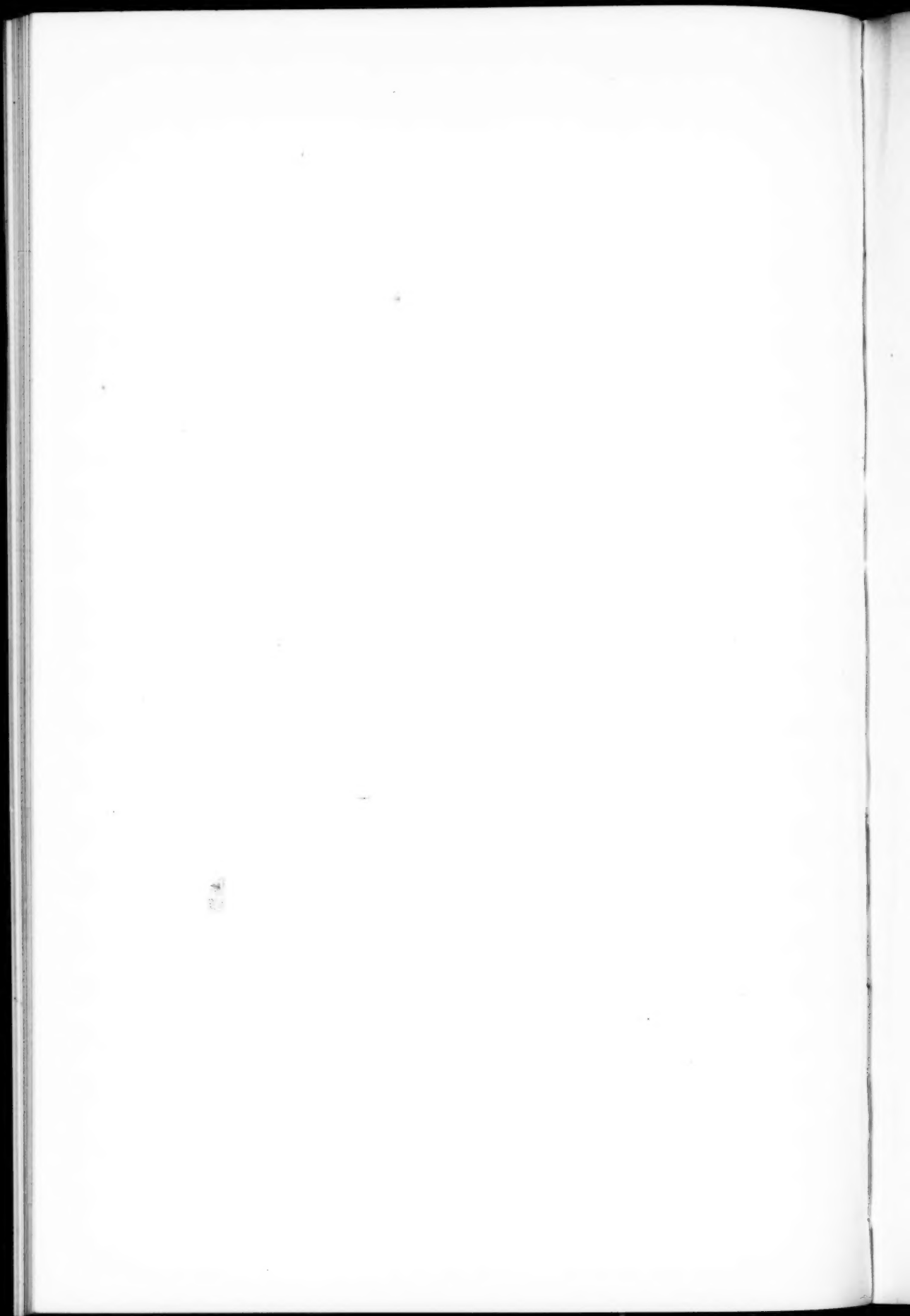
The various possible causes of such coloring have been reviewed by Isakowitz¹. He rejects the explanation that

it might be due to contrast with a yellowish or brownish background. (The plate representing a case seen by Römer² shows a strikingly blue iris.) The explanation by a selective transmission of light is also unsatisfactory, because under direct illumination, the dots of affected tissue do not seem to interfere with the transmission of any of the rays. A fluoroscopic effect changing the color of the light falling on such tissue is not probable, and experiment with a 9 per cent solution of quinin bisulphat confirms the rejection of this hypothesis.

The observation of Professor Rayleigh, applied to this form of cataract by Hess,³ is accepted as indicating the true explanation for this appearance. Lord Rayleigh found that in an opalescent medium containing innumerable fine particles of a different refractive index, the dispersion of light is inversely proportioned to the fourth power of its wave length. Hence the parts of the crystalline lens presenting such irregularities of refractive index



BLUE CATARACT
KOYANAGI'S SECOND CASE



caused the dispersion chiefly of short wave light, green, blue and purple. By such diffuse light, they are rendered visible, blending into blue the color of such spots as seen by daylight, or green as seen by yellow artificial light.

It is of practical importance that this form of partial cataract generally appears early in life, interferes comparatively little with vision, progresses very slowly; and is capable of extraction without iridectomy and without much liability to leave cortex in the capsule.

Koyanagi's three cases studied at the Red Cross Hospital at Osaka, were as follows:

Case I.—A man, aged 21 years, first examined November 19th, 1913. He gave a history of good vision and no trouble with his eyes until four months previously. Then he noticed blurring of vision. There was no difficulty with accommodation, or failure of the reactions of the pupil; and his eyes were free from pain. Corrected vision was: R. 6/8. L. 6/8, the lenses required being 1.75 D. and 2. D. cylinders, respectively. The position and movements of the eyeball, the conjunctiva, cornea and iris were all normal, the diameter of the pupils, 3.5 mm. When examined by oblique illumination, there were seen within the crystalline lens near the edge of the pupil a number of small dots of cloudiness of a greenish color. Examined by direct ophthalmoscopic illumination, these dots caused no shadow. On dilating the pupil, a larger number of such dots were exposed, many of them of an oval or broadly linear form, arranged as radiating from the center of the pupil. But the extreme periphery of the pupil was free from them. Examination of the urine showed neither sugar nor albumin. The eyes were carefully watched for two months, but showed no change.

Case II.—A man, aged 29 years, first seen October 30th, 1913, complained of

blurring of his vision for the last three years, which had improved under treatment, but later became permanent. Each eye had corrected vision of 6/8. On examination both eyes were found alike. There was slight clouding of the cornea, but no blood vessels. There had been no pain, and over the nebula was a depression of the surface. On dilating the pupil, the right eye showed the appearance reproduced in Plate IX. The left eye also showed a Y-shaped blue clouding at the center of the pupil. These spots were easily seen by oblique illumination, but by direct illumination could not be discovered, even by the use of a strong convex lens. The intra-ocular tension was normal, the urine free from sugar or albumin.

Case III.—Man, aged 45 years, was first examined February 9th, 1915. He came for blurring of vision and excessive lacrimation, which had been diagnosed as acute conjunctivitis and in a few days disappeared under treatment. Vision: R. 6/4. L. 6/8. On examination in the dark room, there was found in the anterior portion of the crystalline lens behind the center of the pupil a Y-shaped cloud of greenish color; but by careful examination with direct illumination, nothing could be found. He was examined again in October, when there had been no change in the left eye; and the right eye was still found free from any appearance of opacity. This patient gave a history of an injury to one eye in childhood, but could not remember which eye it was.

(Koyanagi's cases call attention to a condition which has been rather neglected in the literature of ophthalmology, and which is almost unmentioned in the American literature. It is a condition that is certain to be overlooked unless the eye is carefully examined by oblique illumination, and generally with a fairly dilated pupil.—Ed.)

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THE COLOR SENSE

(Om farvesans.)

BIRGER MALLING.

TROMSOE, NORWAY.

Abstract translation of a contribution from the University Physiologic Institute, from the *Norsk Magazin for Laegevidenskaben*, January, 1918, p. 1, by William H. Crisp, M. D. This reports an analytic study of twenty-five cases of slight anomalies of color perception.

The first color-blind patient was described in 1777, and in 1794 Dalton gave a thoro description of himself as color-blind. The study of color-blindness acquired real practical significance when Holmgren demonstrated that a railroad accident at Lagerlunda, Sweden, in 1875 was caused by a color-blind engine driver.

The classic grouping of defects of color vision is based upon Helmholtz's observation that mixture of the spectrum's three colors red, green and blue in various proportions is capable of giving a color impression corresponding to any given color of the spectrum, as these colors appear to the normal individual.

By means of the Rayleigh equation the relation between red and green components in trichromatic subjects (those capable of perceiving all three of the principal colors) has been studied; and it was shown that in a number of apparently normal trichromatics there were distinct variations from the normal in two directions, in that one group needed more of the red component to produce equality, while another group needed more green, that is to say the first group must be regarded as less irritable toward red, the other for green. Inasmuch as the individuals belonging to these two groups require the three usual components in order to see the various colors of the spectrum, but in a proportion differing from that of normal trichromatics, these individuals have been designated as protanomalous or deuteranomalous, according to whether they belong to the first or second group. This classification corresponds to the division of dichromatics, or individuals seeing only two component colors, into protanopes, whose so-called "warm" component's maximum

lies nearer the green, and deuteranopes, whose "warm" maximum lies nearer the red. The protanomalous and deuteranomalous cases represent a transition toward the protanopes and deuteranopes.

The normal trichromatic sees the spectrum as a series of colors shading into one another from the extreme red to the extreme violet. Dichromatics, on the other hand, see the spectrum quite differently: protanopes and deuteranopes see merely two different-colored parts, a "warm" long-waved part, the conception of which approaches yellow, and a "cold" short-waved part, the conception of which approaches blue: these two parts are separated in the green by a so-called neutral region where no color is recognized. Protanopes further show a very characteristic relation in that the spectrum is shortened in the warm part, so that the conception of color and light out in the red part stops sooner than in normal individuals. Tritanopes see a marked shortening in the blue part. Monochromatics see the whole spectrum as one color—colorless—with a maximum intensity in the green, and show a shortening of the spectrum both in the red and in the violet part.

The object of Malling's study was originally to investigate anomalous cases more closely, in order if possible to show more clearly how far they were to be regarded as color-blind or not. Just as with the Rayleigh equation one obtains an expression of the irritability toward green in relation to red, so Malling wished to clear up the comparison between other parts of the spectrum, so as to obtain a more complete picture of the variations in color perception from individual to individual. For this purpose he studied twenty-five cases, eight women and seventeen men, most

of whom were medical students and two graduate physicians; first by means of five "equations" between different parts of the spectrum, second as to the length of the spectrum both in the red and in the violet part, and third as to the "neutral" region.

Malling used for his experiments a modified Helmholtz color mixture apparatus which he describes in some detail. A detailed account of the individual investigations and their results in each subject is also given.

Malling's experiments indicate that there are greater and lesser departures from the normal in a large proportion of the cases examined, and these variations are not only in degree, but also in the nature of the disturbance. The suggestion is made that sooner or later it may be possible to demonstrate transitions from the normal through all forms of color-blindness in an unbroken series to complete color-blindness.

Tables corresponding to variations in perception of the same color from individual to individual show a steady diminution in the perception of nine spectral colors, reaching from the normal to the completely color-blind. The result must be regarded as applicable to every color of the spectrum. The slighter disturbances are as a rule isolated; the severer ones are more frequently present simultaneously at several parts of the spectrum.

The frequency of the various abnormalities is indicated by the following figures: Out of twenty-five cases, there was a reduction in color sense for red of wave length 660 in four cases, for red of wave length 658 in thirteen cases, for orange 600 in five cases, for yellow 576 in one case, for green 524 in five cases, for blue-green 502 in twelve cases, for blue 480 in five cases, for blue-violet 458 in one case, for violet 445 in one case. Out of nine cases there was a reduction for yellow 576 in three cases, for blue 458 in six cases.

There thus appear to be two relatively weak points, one about 658 and one about 502, with diminishing weakness toward both sides. The greatest weakness is at 502 and upward, where

the neutral spot usually appears. Thus the most frequent disturbances are in the red and in the green, in agreement with the relation found in practice, defects in these regions being so common that in using the word color-blind, for practical purposes, one thinks only of red-green blindness.

The numbers also throw an excellent light on the manner in which the red-green blind person's perception of the spectrum arises. In the green toward the blue-green the trouble is worse, and here we have the neutral spot, where the perception of color is entirely absent. From here the trouble has spread in both directions. Toward the blue it is soon arrested, so that as a rule the color-blind person can recognize the difference between blue and violet as two colors. But the relation is otherwise toward the red end, in that here the neighboring green section is markedly affected, the yellow is well recognized, but further along the red section is disturbed. Hence arises the difficulty in distinguishing the different colors in the long-waved portion of the spectrum: since the yellow is most definitely perceived, it happens naturally that the neighboring colors are confused with and approach yellow in their perception, and this part of the spectrum is seen as yellow.

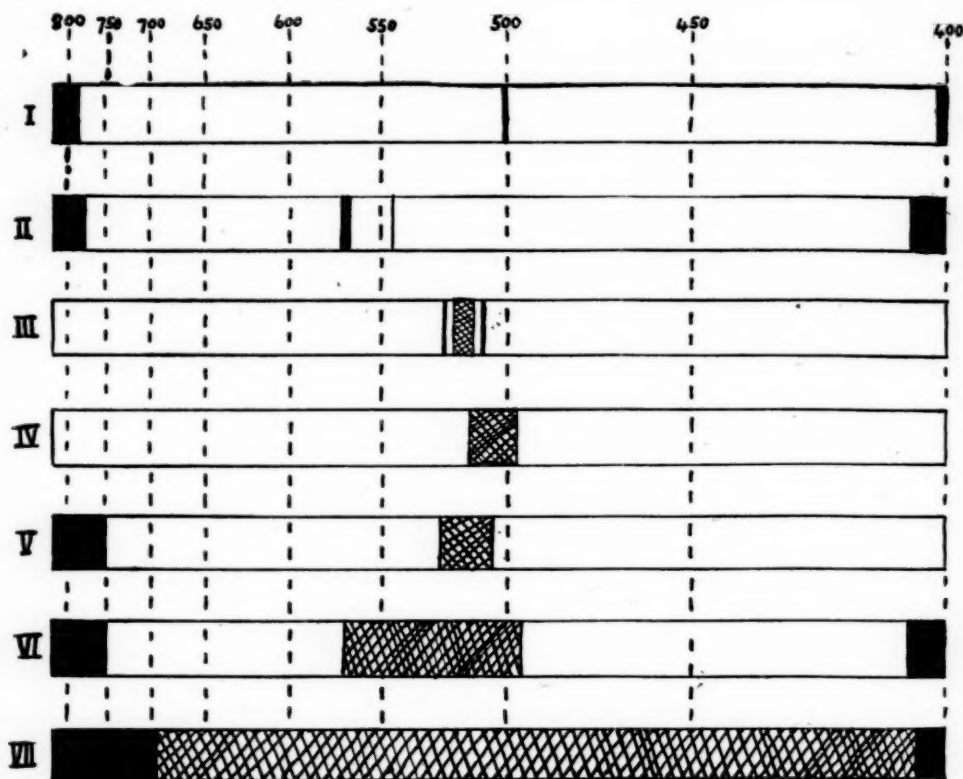
In six of the subjects examined a neutral spot was found. This was far from being the same spot in all subjects, but varied distinctly both in position and extent. It also varied in intensity, in that in some subjects there could be traced a slight indication of color, what Malling calls an incomplete neutral spot, in distinction from the complete where the normal color is merely seen as gray. These areas are always seen by the normal person as possessing an intense color.

Chart I in the illustration shows a quite small incomplete or almost complete neutral spot at 500. Chart II shows two narrow incomplete neutral spots at 542 and 566, of which the latter is most pronounced and is almost complete. Chart III shows a somewhat broad complete neutral spot between 508 and 512: at the immediate bound-

aries of this spot color is recognized, but beyond these boundaries again there appears a narrow, incomplete neutral spot at 506 and one at 515: beyond these two color perception rapidly increases. Chart IV shows a broad, complete neutral spot from 508 to 498. Chart V shows a complete neutral spot from 517 to 503. Chart VII is the spectrum of a completely color-blind person, and may be considered as a single neutral spot. There is nothing to prevent our imagining all the neutral spots shown in figures I to V as occurring in the same person and

turbances of similar nature with the neutral spot.

It is thus seen that the neutral spot may occur incomplete or complete, may be singular or plural in number, and may vary in location and extent. The pseudo-monochromatic must certainly be regarded as an intermediate step between Chart VI and Chart VII since he is characterized by being able to recognize colors only in the outer parts of the spectrum, and this only to so slight an extent that he may give the impression of being monochromatic.



Charts showing neutral zones in the spectrum in cases of anomalous color perception. (Malling) Roman numerals on the left indicate numbers of the charts as referred to in the text. Arabic figures at top indicate wave-lengths in different portions of spectrum.

also extending to the intermediate parts of the spectrum. The neutral spot which would thus be formed is indicated in Chart VI. The figures also show shortenings of the spectrum, which must merely be regarded as dis-

The so-called anomalous cases are to be regarded as cases of color disturbance with defect chiefly in the red or in the green, but without either of these colors losing its specific color. Whether these cases shall be called

a type or not is merely a question of words. They are a frequently occurring departure from the normal, with all transitions on the one side to the normal, on the other to the completely red-green blind; so that the boundaries of the group will always be variable. If the anomalous person's defect in red or green goes so far that one of these lacks its specific color impression, one has the case described as extreme anomalous, and characterized by being able to establish an equation between green and yellow or red and yellow, but never both equations at the same time. If the defect goes still further so that in addition to the green (or red) the red (or green) part of the spectrum also loses its specific color, the power to distinguish the colors of the long-waved portion of the spectrum will be completely lost and one has the completely red-green blind.

Malling traces through a series of illustrative cases the stepwise departure from the normal toward the pathologic. One case, a definite anomalous with defect principally in the green, although still retaining specific green perception of inferior quality, is compared with

another case showing a similar defect in the red. In a third case, green perception is extremely reduced and this case approaches the so-called extreme anomalous, in that it can form an equation between a yellow and a green which are not too widely separated from one another in the spectrum (582 and 540). A fourth case lacks specific green and red perception, is a typical red-green blind, and can form an equation between all colors in the long-waved part of the spectrum. This group is of great practical importance in daily life, and the moderate degrees of this color disturbance present material difficulties in the determination of the problem whether they are practically competent as to color or not. For example cases unsuitable for purposes of navigation may succeed in passing the ordinary color tests; while on the other hand the various anomaloscopes, while furnishing information as to even small departures from the normal in green and red perception, do not necessarily indicate the proper boundary line between those who may and those who may not be properly employed in special services.

TOTAL ACHROMATOPSIA.

OTTO WERNICKE, M. D.

BUENOS AIRES.

Abstract translation from the Boletín de la Sociedad de Oftalmología de Buenos Aires, Año IV, p. 159, by M. Uribe-Troncoso, M. D. This reports the cases of two brothers, and gives a general review of the subject.

Altho partial blindness for colors is of common occurrence, total achromatopsia is very rare. The number of cases reported has increased recently since we have learned to suspect the condition by other and more noticeable symptoms than the color tests.

Achromatopes learn to distinguish colors and even to name them by their respective differences in brightness, by the presence or absence of reflexes on

the surface, by the form of the objects and by habit. But for them the world is only an engraving with shades of gray and white. They generally go to the oculist to be relieved of three important symptoms, viz., low visual acuity, photophobia and nystagmus.

Visual acuity generally varies from $1/10$ to $1/5$; rarely reaches $1/3$. Only one case is reported in the literature (Raehlmann) in which acuity of vision

was normal. Low vision is due in some cases to corneal scars, atrophy of the optic nerve, macular choroiditis, albinism, etc., but in the majority of cases there is no organic lesion which may account for it. The amblyopia is almost constant, and not a mere coincidence as has been suggested. This may give some clue for ascertaining the cause of the anomaly.

Photophobia is correlated to this symptom, nystagmus. When the former is severe the latter is very marked and vice-versa. With the photophobia the forehead is wrinkled, eyebrows contracted, palpebral aperture very narrow, and head flexed. Dread of light increases with the intensity of illumination and decreases at night.

Luminous sense is normal in achromatopes. The nystagmus is rarely wanting, but it is not as constant as the amblyopia, and in some cases ceases with advancing age. It generally increases on fixation, and is probably due to another very important symptom, central scotoma.

Roenne was the first to detect central scotoma, which has been found in nearly half of the patients. But it is necessary to have always in mind that its detection is very difficult, and sometimes impossible. Uhthoff did not find it in one of his patients at first; but was able a year later to plot it with the ring-shaped fixation test.

According to Grünert, even in cases in which central scotoma could not be detected, an anomaly of the macula, or of the macular fibres, certainly existed. This is the only way to explain how, with very low central vision, the limits of the visual field and peripheral vision in general were normal.

Achromatopes see the color red, and those near it in the spectrum, as a dark spot, and violet and nearby colors brighter than with the normal eye. Red is mistaken for black. Yellow-green is the brightest. The limits of the spectrum are either the same as normal or a shortening of the red end or of both ends may be present. The best method for detecting achromatopsia is Holmgren's test. The Hering disk and the spectroscope are also useful.

Dr. Wernicke's patients were two brothers 18 and 12 years of age, in a family of seven. No history of consanguinity. Daylight was troublesome and provoked continual blinking. If the elder brother maintained the eyes opened in a strong light, after a few moments all appeared white to him. Vision improves at dusk. He is scarcely able to read, and his school work was so difficult that he went to work in a hat store, from which he was discharged because of his inability to distinguish colors.

Pupils react well to light and in accommodation. Fundus normal. Hyperopic astigmatism of half a diopter. Correction did not improve vision, which is only $1/10$ for R. E. and $2/10$ for L. E. Nystagmus is present and consists of small, very rapid, vertical movements, which do not increase on fixation. Red is mistaken with black; and colors selected according to their brightness.

In the younger brother, the symptoms were alike. Vision: R. E. $1/10?$; L. E. $1/10$.

Clinical findings in cases of achromatopsia have exerted the greatest influence on the theories of color vision. Both the Young-Helmholtz and Hering theories needed to be modified in order to explain this condition. The first theory was modified by Parinaud and Charpentier, and holds that the function of the cones is restricted to color sensations and that the function of the rods is the perception of light and dark and also black and white.

These two systems do not work simultaneously. When the light is strong, the cones transmit the sensation of all colors to the brain, but when illumination decreases, the cones cease to become stimulated, and then the rods begin to perceive sensations by the destruction of the visual purple. As the regeneration is very slow, peripheral vision is always bad in normal eyes, particularly in low illumination for which the cones are not adapted. Hence the achromatopsia of the normal eye in darkness. Total achromatopsia is due to lack of cones in the macula.

This produces also the central scotoma and accounts for the poor vision of these patients and the nystagmus.

Hering's theory also is capable of explaining achromatopsia, if modified to admit the duplicity of the function

for the rods and cones as suggested by Parinaud and Charpentier. It will explain more easily the case of Raehlmann in which achromatopsia was attended with normal vision and photophobia and nystagmus were absent.

SHORT ABSTRACTS.

Recent papers containing points of the greatest importance capable of presentation in this form are here noticed. For a systematic review of all the current literature in ophthalmology see "Digest of the Literature," a part of which is published each month.

Demaria, E. B.—Hydatid Cyst in Eyeball. (Boletín de la Sociedad de Oftalmología de Buenos Aires, Año IV, p. 41.)

Echinococcus is very common in Argentina, but an intraocular localization of this parasite has never been described. Demaria had been unable to find it in many hundreds of enucleated eyes sectioned at the Ophthalmic Clinic in Buenos Aires. This is the more surprising, because it is very common in all other parts of the body, even in the orbit (20 cases reported in Argentina); and by comparison with the cysticercus, which has so marked a tendency to grow in the eye, that some writers have considered it as its habitual place of living.

In the whole of ophthalmic literature there are only four cases reported as intraocular hydatid cysts; and of these only one is reliable. Yet both tenias, the solium and the echinococcus, live and migrate in the same manner in the body.

Prof. Demaria's patient presented slight pericorneal injection, the iris completely applied to the posterior part of the cornea, the lens cataractous, tension + 2; no light perception. An intraocular tumor with secondary glaucoma was diagnosed, and a trephining operation done, which relieved tension for a few days. But a new attack of pain having set in, the eye was enucleated.

Section of the globe gave exit to a transparent liquid, as clear as "water

from a rock;" and a cyst was discovered filling entirely the vitreous cavity, and adhering to the retina and lens. The cystic membrane was characteristic. No daughter vesicles were present but several proligerous vesicles adherent to the wall and containing scoleces could be observed.

An important characteristic feature was the absence of a pericystic membrane and of leucocytic infiltration; which the author attributes to the lack of inflammation of the tissues. The membrane is only a defensive reaction of nature against the parasite, and it seems that in this case the cyst only acted in a mechanical way during all its growth. This lack of inflammation makes a most important difference from the cysticercus, which always produces a great irritation on the tissues of the eye, intense cyclitis, disorganization and even sympathetic ophthalmitis.

The author reviews afterwards in detail the five cases reported in the literature (Gescheidt, Griffith, Werner, Wood and Scholtz), and only considers reliable that of Werner.

The modern methods of serodiagnosis (Appathie and Lorenz in Argentina, Guedini in Europe), have a great diagnostic value in echinococcus disease. It was positive in Demaria's case and is reliable and constant. Eosinophilia is to be found in about 67 per cent of the patients, and is not pathognomonic.

URIBE-TRONCOSO.

Zeemann, W. P. C.—Binocular Perception of Brightness. (*Nederl Tydschr. v. Geneesk.*, 1917, p. 265.)

Zeemann experimented with Otto Roelofs regarding binocularly observed brightness and the impressions which each eye separately received, especially when these impressions had an unequal brightness. Previously they had been able to demonstrate that in dark-adaptation summation of stimuli does not exist, neither in light adaptation; and they concluded that there is no question of a summation of the stimuli received from both sides during the formation of a binocular perception of brightness, anyhow while looking at larger brightnesses.

In contradiction herewith is the binocular threshold value for light perception lower than monocular. They thought that "the black which corresponds with the covered eye weakens the minimal white perceived in the other eye, because the absence of outlines on both sides make that both eyes have an equal part in the resulting perception, as to neither of the eyes a larger part in the perception is given by the presence of outline. The monocular determination was therefore not clearly monocular: only when one eye sees distinct outlines, sharp contrasts thus with greater brightness, then the weight of this is so preponderant for the binocular perception, that one can speak of a monocular observation.

This hypothesis, where the outlines play such a great role, and the significance already given to the outlines by Helmholtz induced them to find out more about the influence of these outlines and their significance. This was done by placing cartoons in the stereoscope, which were changed quickly. On all these cartoons at the right was a gray of stronger brightness than at the left. The sort of paper was the same for all. The gray which was perceived, was darker than the light and lighter than the dark field. The experiments seemed distinctly to prove the significance of the outlines; it makes entirely the impression as if the figure attracts the attention and so gives a preponder-

ant significance to the retinal image in the concerned eye.

Experiments now were done, so that the influence of the outlines in different parts of the visual field were different and thus the part of each retinal image of the binocular perception was not everywhere equal. The results of these observations are as follows:

1. If a grey of unequal brightness is seen by each eye, then in general the impressions will fuse; this is not a summation of the stimuli, as the binocular impression ought to be then always brighter than each monocular; it lies away between both.

2. The binocular impression is no constant quantity.

3. Specially the outlines give a preponderant significance to one of the retinal images.

4. This influence does not depend on light, contrast, etc., but on the force wherewith it directs the attention on one of the retinal images or parts thereof.

5. These experiments justify our supposition, that in the determination of the monocular threshold-value the part of both impressions is equal on account of absence of outlines, while with monocular observation of stronger illuminated fields the significance of the covered eye is reduced to a minimum through the one-sidedness of the outlines. If the absence of outlines is of influence on threshold determinations, we must expect that the same will happen when we use stronger illuminations, with exclusion of outlines; this can be done through determination of the so-called differential sensibility in stronger illumination.

The experiments confirm the expectations. The conviction is strengthened that the threshold determinations of the lightsense are nothing else than determinations of the sensitiveness of distinguishing, and that the same laws are binding for both. Moreover, we are convinced that the laws are not different from those which regulate binocular vision also with greater brightness and stronger contrast as well in light as in dark-adaptation.

The experiments illuminate sharply the intimate cooperation of both eyes even in circumstances where a clear exclusion of one was suspected, so from the other side is demonstrated strikingly in the experiments the independence of each system separately until in the higher centers; if the systems coming from both eyes should unite in lower cerebral parts an influence of outlines, as was here found, could not be thinkable. E. E. B.

Gowland, A.—Voluntary Nystagmus. (Boletín de la Sociedad de Oftalmología de Buenos Aires, Año IV, p. 117.

Before reporting his case, the author reviews all we know about nystagmus, its divisions, symptoms and etiology. The involuntary or ordinary nystagmus is defined according to Sauvigneau's convulsive phenomenon related to an irritative lesion of the center commanding the associated lateral movements.

Voluntary nystagmus is very rare and the cases reported in the literature are very scarce. Dr. Gowland's patient was a man 36 years old in good health, who only wanted to have glasses fitted. He attributed the diminution of his vision to a "voluntary twitching" of his eyes. He was able to produce at will a horizontal nystagmus, which persisted in every direction in which the eyes were moved. Pupillary reaction normal; no hippus, no anisocoria; fundus normal. Refraction: simple hypermetropic astigmatism of one diopter.

During the oscillations all objects were seen moving.

A strong concentration of will power upon the eyes was necessary to produce the condition.

This voluntary twitching existed since childhood and was a source of merriment for him during his school days.

The father is dead; mother and two brothers living and in good health.

Voluntary nystagmus has been divided into three groups: rhythmic physiologic; true voluntary nystagmus, and the associated, or Straunsky's and reflex, or Bar's. Affergeld, who studied the first type, showed that it occurs

with the lateral movements of the eyes, when rhythmic horizontal or rotatory, symmetric oscillations of the globe supervene, specially marked on the side to which the eyes are rotated. It is observed in subjects without any disease of the eyes, ears, or nervous system, and is probably the result of the muscular strain in forced lateral movements. The extreme conjugate deviation of the eyes, probably produces a stimulation similar to that provoked by vestibular stimulus, and extends to the rhythmic centers.

True voluntary nystagmus appears according to Raehlmann only in patients with marked visual anomalies which have existed from childhood, but Coppez's cases and also the one described by Gowland, show that visual anomalies are not necessarily present. Nystagmography showed that contractions are irregular, without definite character, of variable duration and changing from one twitch to the other.

Wecker has described a case associated with contraction of the pupil, and Coppez another with hippus. In this case the oscillations disappeared during the lateral movements.

The pathogeny of this rare condition, according to Coppez, must be ascribed to the following causes. In normal conditions the will acts only upon one center of association for moving the eyes in a lateral direction, but in nystagmus the voluntary stimulus goes to the centers on both sides, and if some kind of heterophoria is present the deviation at once appears. The position of the globes being modified and the ocular muscles subjected to an exaggerated tonus, react as usual by contraction and the nystagmus results.

The retraction of the lids during the twitching proves that the levator palpebrae also receive an exaggerated stimulus. Associated nystagmus described by Straunsky in 1900 is a variety of voluntary nystagmus due to the defensive reaction of the organism and produced in an indirect way. It occurs in patients suffering from palpebral and corneal lesions or those with photophobia when an attempt to open the

lids is made. It has been observed also in perfectly normal subjects.

Bar described cases of conjunctivitis in which the retraction of the lid produced oscillations in the globes of an undulatory type probably due to a reflex movement by stimulation of the trigeminus. This may be caused also by a foreign body, a corneal ulceration or simply by any loss of epithelium of the cornea. The stimulus is transmitted to the bulbar nucleus of the trigeminus and by the posterior longitudinal fasciculus to the nucleus of the oculo-motor and its association centers.

U. T.

Barraquer and Anduyned.—A Gentle Method for the Extraction of Cataract in Capsule. (*La Clinique Ophtalmologique*, 1917, p. 328.)

These writers liken an incomplete cataract extraction to a simple evacuation of a cyst without destruction of its wall. All methods previously used tend to exert undue trauma of the eye, and are therefore dangerous. The authors discovered by means of experiments that a cupping glass with a suction of 45 c. m. of mercury applied to the anterior capsule lifted the lens without damaging the membrane. The instrument illustrated is a most ingenious device made of metal about the size of a 2 c. c. Luer syringe, with the cup like a small curette inserted in one end. The interior arrangement has two chambers connecting, and operated by two pneumatic cushions, which are controlled by the surgeon's thumb and finger. Pressure upon these buttons causes a vacuum of 50 c. m. in the chamber to which is fastened the tip, and the lens is removed without force, the results being most gratifying.

They call the operation Facodialysis

and the instrument "Erisifaco," the derivation being *eriseo* (tear out) and *facos* (lens).

J. S. W.

(This paper makes no mention of the previous successful application of the same principle by V. H. Hulen (*Ophth. Rec.* Dec., 1910). Dr. Hulen's method used a similar cup, with a vacuum secured without the specialized apparatus above described.—Ed.)

Aymard, J. L.—A Cartilage Prosthesis for the Eye. (*The Lancet*, Oct. 27, 1917.)

The writer says that the failure of the artificial eye from the cosmetic point of view depends upon two main factors, immobility and depression. The former condition is due to the absence of a mass of tissue fitting inside the artificial glass casing, and the latter to the fact that a sphere has been replaced by a shell. He considers that there can be no question of the advantage of the use of natural tissues for prosthesis in place of glass or metal. He employs spheres constructed from the costal cartilages and finds that these become connected by vascular communication with the blood vessels in the capsule or surrounding tissues. Two hemispheres are trephined from the eighth costal cartilage and pegged together with cartilage or fixed with catgut. The cartilage sphere is placed inside of Tenon's capsule and the latter sutured; then the conjunctiva is sutured. He has used the cartilage spheres only in nonseptic cases. But he believes it is worth while trying them in septic conditions also; since the resisting power of cartilage to sepsis has been found remarkable in nasal cases.

C. H. M.

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EDITORIALS.

ECLIPSE BLINDING.

Opportunity to study the pathologic effects of exposure of the human retina to intense sunlight follows each important eclipse of the sun. After the eclipse that was visible from Northern Europe in April, 1912, there were more than twenty papers published in ophthalmic journals, that dealt with reports of cases of this form of injury, and they continued to appear for nearly three years after the eclipse. Isolated cases of such lesions produced in other ways occur, but the most important part of our knowledge of the subject has come from the eclipse cases.

The symptom always present, and which generally brings the patient under observation, is the central scotoma, appearing suddenly after the exposure and generally relative but sometimes absolute. Such a scotoma is hard to map, being small, usually not over 1° in diameter, involving the fixation point and often bilateral. In the majority of cases, it disappears within a month, but may last for several months, or prove quite permanent.

Sometimes scotomas occur in other parts of the field, relative ring scotomas having been noticed. Another subjective symptom is "dazzling" or "quivering" of objects, which may be very annoying and may continue even after central vision appears to be almost or quite up to standard. Color scotoma early and metamorphopsia at a late stage are frequent subjective symptoms.

Ophthalmoscopic changes are not always present; but in some series they have been noted in 80 per cent of the cases. Generally they are slight. Light spots on an abnormally dark macula are the most common; and next to that a general edema of the macular region with a cherry red spot at the fovea, which is found in the first days after the injury. But more severe and permanent injuries are not rare. Hemorrhage into the retina has been noted, sometimes persisting for a long time, even where ultimate recovery of vision occurred. Optic neuritis and optic atrophy seem to belong to certain cases of eclipse blinding, and white spots, al-

tered pigmentation of the macula and hole in the macula have been reported in numerous cases.

The prognosis is generally good. In nearly all cases, vision improves some. In many cases it ultimately reaches normal, altho often not for several months. In only a very few cases is there a progressive decline of vision. The prognosis is better the earlier the recovery begins, even tho months of annoying disability may intervene before it is complete. Unfavorable symptoms are metamorphopsia, marked changes of pigmentation, distinct white spots, hole in the macula, or optic atrophy.

• Prevention of such injuries is the important practical matter connected with eclipse blinding. The dangerous exposure occurs thru ignorance and the remedy is education. This education can be most effectively given thru newspapers and popular magazines in the period when public interest in the subject is awakened just before the occurrence of such an eclipse. On June 8th, a total eclipse of the sun will be visible from the western and southern parts of the United States. The path of totality, lasting from one second to two minutes, will enter the United States north of the mouth of the Columbia river, and, passing southeasterly across a dozen states, will reach the Atlantic ocean, north of the center of the east coast of Florida. This eclipse will be a most striking phenomenon thruout a region inhabited by one hundred million people. In every part of the United States more than half the sun's disk will be hidden. The opportunity and responsibility for the education of the public will be a great one for the oculists living thruout this region. It is by rendering such public services that the profession can get and hold the leadership of public thought with regard to the matters on which its leadership should be admitted and recognized.

After the eclipse of April 17th, 1912, it was estimated by Werdenberg that 3,500 cases of eclipse blinding occurred in Germany. Cords learned of 387 cases, of which 166 were severe. Birch-

Hirschfeld reported 43 cases involving 50 eyes; and 39 cases involving 54 eyes, all but seven of which showed ophthalmoscopic changes were reported from the Tübingen clinic. If some such trail of disability does not follow the June eclipse, it will be because the intelligence of the American people is appealed to by a campaign of education. The time for it is short; what is to be done must be done at once. The agencies that can be used most effectively in this work are the newspapers and the public schools.

The eclipse of the sun is a striking opportunity for teaching children the rudiments regarding the movements of the heavenly bodies; and it will be utilized in a great many schools for that purpose. Along with such teaching should be some simple instruction with regard to the danger of watching the eclipse with unprotected eyes; and the means of avoiding such danger. The newspapers, always on the alert for what is sensational and exceptional, can be utilized to give the widest publicity to the subject of eclipse blinding, in the shortest time. If each reader of the AMERICAN JOURNAL OF OPHTHALMOLOGY will bring this matter to the attention of his local school authorities and local newspapers, a great deal of damage can be prevented.

The means of preventing eclipse blinding are extremely simple and universally available. It is merely necessary to reduce the light of the sun within the limits of what the human eye can stand without injury. Whenever a match and a piece of window glass are available, the old-fashioned smoked glass can be prepared. But a more cleanly, safe, convenient means is a piece of developed photographic film. The part of a rather dense negative that represents the sky may be all that is necessary; but film specially exposed and prepared for the purpose is better. Opticians, druggists and vendors of photographic supplies should be interested in seeing that the public is well supplied with this preventive of eclipse blindness. A card with a pin-hole in it can be used, provided the hole is not

more than one-half millimeter in diameter. But this is inferior to the photographic film.
E. J.

BLOOD PRESSURE AND INTRA-OCULAR PRESSURE.

The possible connection of glaucoma with increased blood pressure has been a subject of discussion ever since the clinical study of the blood pressure with the sphygmomanometer became common. But no general direct connection between the two has been demonstrated. They may be associated, but the association seems incidental rather than essential. Blood pressure on the average increases with age; glaucoma is chiefly a disease of later life. A certain number of cases of glaucoma, as the hemorrhagic cases, are secondary to vascular disease attended with high blood pressure. Certain toxic conditions will raise the blood pressure and may cause glaucoma.

On the other hand considerable statistical studies show no distinctly higher average of blood pressure in glaucomatous patients, than in non-glaucomatous patients of similar age. Glaucoma may arise, and especially simple glaucoma, in persons whose blood pressure is distinctly below the average; and it has been suggested that the essential pathologic condition in glaucoma may be a relative excess of intraocular pressure over blood pressure, impairing the nutrition of the intraocular tissues, and causing glaucomatous atrophy.

Nevertheless, from the laws of mechanics, necessarily operative in the eyeball, we must infer that a better understanding of blood pressure and the factors which are concerned in producing and regulating it, will help us to a better understanding of intraocular pressure. This gives interest and importance to the experimental studies of Priestley Smith on the "Blood Pressure in the Eye and Its Relation to the Chamber Pressure," two parts of which have been published in the *British Journal of Ophthalmology*.

When blood pressure is spoken of, generally the arterial pressure, and sometimes only the maximum or systolic pressure on the arteries, is referred to. It is easy to lose sight of the fact that the normal "blood pressure" varies from the maximum of 100 to 150 mm. of mercury on the walls of the aorta as the blood leaves the heart, to zero or a negative pressure as it returns thru the great veins. Probably the blood enters the eye under a normal systolic pressure of about 100 mm. of mercury, and leaves the eye under a pressure of 15 to 25 mm. of mercury. Between these two limits lie the possibilities of intraocular pressure, for in the living eye the nutritive fluid must be always entering and leaving it. Increased arterial pressure makes possible a higher intraocular pressure and perhaps the hardest eyeballs are only to be encountered in those who have high arterial pressure. Whether the intraocular tension can rise much above the systolic pressure in the arteries seems doubtful. But pretty certainly intraocular pressure is most closely related to the blood pressure in the capillaries.

It is the question of the capillary blood pressure that Priestley Smith takes up in his first papers. If an incompressible fluid flows thru a straight tube of uniform calibre at a uniform velocity, the decrease of pressure will progress regularly from the point at which the fluid enters the tube to its exit, the resistance overcome being the same at all points. But if the resistance be lowered at the middle of the tube, the pressure will diminish more rapidly in the first part and the pressure be lower at the centre than a mean between the two ends. On the other hand, if the resistance be increased at the centre, the pressure in the tube will fall more slowly in the first part and more rapidly in the latter part; and will be higher at the centre than the mean between the two ends.

In the eye with the branching of the arteries, the aggregate caliber of the vessels that carry the blood stream is increased. This tends to lower the resistance to its passage. But a channel

made up of small tubes offers very much more resistance to the passage of fluid, than does one of a single tube having a cross section equal to that of all the small tubes. In this way the subdivision of the arteries tends to increase the resistance offered to the passage of the blood. Thus the influence of the increased total cross-section in the capillaries is opposed by the influence of diminished caliber of the individual capillaries that furnish this increased aggregate cross-section.

From his experiments with fluid flowing thru glass tubes, his studies of the capillary circulation in the living frog, his examination of the injected vessels of the retina and his subjective observation of the capillary circulation of the blood in the macula, Priestley Smith concludes: "The probability seems to be that the blood-stream, as a rule, encounters more and more resistance (per unit of distance travelled) as it subdivides, and finds the maximum where the channels are most numerous, and where its essential work is done, namely, in the capillaries; but that variations in this respect are present in different parts, and occur in the same part at different times." It will be interesting to follow his application of these studies to a discussion of the relation of this capillary pressure to the intraocular tension.

There can be no question that it is in the capillary circulation that the great part of vital interchange of fluids takes place. This part of the blood-stream may be compared to the fall of a millstream over the mill wheel. Here is where the work is done. The flow of blood thru arteries and veins is comparable to the flow of the stream by which the water is carried to the mill wheel, and then conducted away after it has been used. It is this pressure, rapidly falling from arterial to venous in the capillaries, that we need to know more about.

The blood flows swiftly in the center of the stream and very slowly along the walls of the vessel. The resistance from friction, which is proportioned to the velocity, is therefore chiefly from friction between the particles of the

blood rather than between the blood and the vessel wall. The viscosity of the blood, its internal friction, has an influence of general and great importance in determining this resistance. If we can get the problems that confront us clearly stated, an important step will have been taken toward solving the relations of the different factors that determine blood pressure and intraocular pressure.

E. J.

INSTITUTION FOR EDUCATION OF BLINDED SOLDIERS

As is well known, the present war has been more prolific in wounds of the head than any previous one, because of the nature of the weapons used, high explosive shells and shrapnel; and of the character of the defense against attack employed, the trenches leaving the head most exposed to injury. A large proportion of these wounds affect the eyesight, either by direct injury to the eyeball or by injury to the fibers of the optic nerve or visual tracts somewhere in their course.

If only one eye is affected, the condition while deplorable, is not hopeless, as there are many occupations where monocular vision is sufficient for efficient work. On the other hand, an all too large number of cases of injury results either in complete blindness, or a diminution of vision below the amount necessary for even the ordinary affairs of life. What is the country doing or planning to do for these men? It would seem that now is the time to make preparations, and not after the possible flood of injured has rolled back upon us from the fields of war.

There are four possible ways of meeting the situation:

(1) Relegation of the injured to institutions previously established in various states.

(2) Establishment of such institutions in the several states.

(3) Establishment of one central institution, preferably in some large city, with adequate equipment and facilities for the disposal of articles manufactured.

(4) Provision for the aid of such soldiers in their own or other homes.

Plan number one has the defect that the existing institutions are too few and too small to care for the probable number. At the best, it would be but a makeshift, and it is time for the United States to get away from makeshifts.

Plan number two opens the way for "pork" and is less efficient than plan three, besides being more expensive in the beginning, and to maintain.

Plan number three is the ideal one. Care and housing of the injured, equipment and disposal of production are simplified.

Plan number four is more expensive and less efficient, but should not be totally discarded. There are a large number of blind soldiers who would prefer to live at home; and who could make a fair living in certain trades, such as piano tuning, weaving baskets, etc., if some way of marketing their products could be arranged. The increased expense should cheerfully be borne by the state, in view of the tremendous sacrifice these men have made.

A combination of plans three and four would be possible and workable, but should be started now. The experiences of the French and English could be drawn upon and modified to meet our conditions. There seems to be no representative popular body to take up the support of such measures, but the AMERICAN JOURNAL OF OPHTHALMOLOGY proposes to do all it can to urge on the attention of the profession and the public, this need of the war blind. What suggestions and assistance can our readers offer in this matter?

C. L.

THE PRICE OF THIS JOURNAL.

When it was proposed to form this journal by the union of journals previously existing, it was pointed out that they cost \$34.50 per year, while by a merger avoiding duplication of read-

ing, there would also be avoided a duplication of expense: that for the smaller price of the one journal, all that was essential in its predecessors would be secured, and additional features of value would be possible. But probably few readers realize that, word for word, this journal costs less to its readers than any other ophthalmic journal published in the English language.

The relative price of a journal is not shown by the price per volume or the number of pages furnished per dollar. The number of words per page has to be taken into account. For instance, last year the *Ophthalmic Record* gave 652 pages of 428 words per page, 279,056 words for four dollars, or 69,764 words per dollar. The *Annals of Ophthalmology* printed 683 pages of 393 words per page, 268,419 words, or 67,105 words per dollar.

Estimated in this way, the price of the AMERICAN JOURNAL OF OPHTHALMOLOGY is less than the price of either of the journals merged to form it; and less than that of either of the other ophthalmic journals now published in English. The four numbers published give 382 pages, averaging 708 words per page. This amounts to 81,291 words per dollar of subscription price. The *British Journal of Ophthalmology* published last year 784 pages of 510 words per page, or 53,310 words per dollar. The *Archives of Ophthalmology* in 1917 published 611 pages of 374 words per page, or 45,703 words per dollar.

The AMERICAN JOURNAL OF OPHTHALMOLOGY will publish this year 26 per cent more matter than both of the other journals put together, and for 20 per cent less money. Of course this result is only rendered possible by our larger list of subscribers, by the support that has been given to this co-operative movement by the ophthalmologists of America. The essential fact is, there are enough ophthalmologists who are ready to spend ten dollars a year for the literature of their specialty to make such a publication possible.

E. J.

OPHTHALMIC SECTION, A. M. A.

The largest annual meeting of ophthalmologists held anywhere in the world is that of the Section on Ophthalmology of the American Medical Association. This year when its chief rivals are all more immediately under the adverse influence of the war, its supremacy will be more striking than usual. The place of meeting, Chicago, the headquarters of the Association, within an easy journey of the great majority of its members, favors a good attendance; and a good series of practical subjects will be presented for discussion.

The local arrangements include five days of clinics extending from June 6th to June 11th. Besides its undergraduate and graduate medical schools, every large hospital and dispensary in the city has its ophthalmic department, which will be utilized to the full to provide instruction and entertainment for those who come to attend the meeting. The announcement of detailed plans will be found in the *Journal of the A. M. A.* If for no other reason, any ophthalmologist would be justified in going to considerable expense and inconvenience to attend the meeting and get his name on the register of Section members, in order that he might receive from year to year the pre-session volume of papers to be presented to the Section.

The section headquarters and meeting place will be at the Hotel La Salle.

BOOK NOTICES.

TESTS FOR COLOR BLINDNESS, by Dr. Shinobu Ishihara, Major, I. J. A. M. C., Tokyo, Japan. Sixteen colored plates with explanatory text. Tokyo, 1917.

Dr. Ishihara, who is instructor at the Military Medical Academy in Tokyo, has produced something novel in the way of tests for color blindness. They are the working out of a plan to which he first called attention in the *Nippon Gankwa Zasshi* (*Journal of Japanese Ophthalmologists*) in 1916. Each test is a plate of colored circles of various sizes. Part of these circles are of va-

rious shades and tints of one color constituting a figure; while the remainder are shades and tints of a color that is a confusion color for the first, and which form a background for the figure.

On most of the plates it is easy for the eye with normal color perception to see the figure against the background; but the color blind fail to perceive it. On a few, the coloring is such that the figure is more readily perceived by the color blind than by the normal sighted; and there is one plate on which the figures are equally well perceived by both.

The explanation and directions are given in English and also in Japanese. The work is a positive addition to our resources for the study of normal and defective color perception. E. J.

STATE LEGISLATION CONCERNING THE EYE, by Frank Allport, M. D., LL.D., of Chicago. 8vo, 552 pages. Riddle & Wunderle Company, Chicago, Ill., 1917.

This volume includes a series of articles published in *Ophthalmology* in July, 1915, to July, 1917, to which has been added a brief preface. It is about as good and up-to-date a presentation of its subject as we can conceive possible; although, as the author points out, since the first article was printed, some legislatures have met and passed laws relating to the eye.

It is arranged according to the subjects of legislation as follows:

"Examination of School Children's Eyes, Ears, Noses and Throats," laws in 17 states, 27 pages.

"Legislation Concerning Ophthalmia Neonatorum in 31 States," 51 pages.

"Legislation Concerning Trachoma," special laws in 8 states, classing it as a contagious disease in 23 states, total 31 states, 17 pages.

"Legislation Concerning Wood Alcohol," 31 states, 34 pages; "Concerning Shop Lighting," 14 states; "Accidents," 22 states; "The Common Towel," 16 states; "Conditions of Labor Compensation," etc., 15 states; in all, 60 pages.

"State Legislation Concerning Optometry," 39 states, 144 pages.

"State Legislation Concerning the Blind," every state except Nevada, 216 pages.

Each chapter is paged separately and no table of contents is furnished. However, the grouping under one head of all the legislation in the different states relating to that particular subject makes it a very valuable work of reference for anyone studying legislation relating to any of these subjects.

It is a volume that has entailed an immense amount of labor in its preparation. As the author states, over 10,000 circular and personal letters were sent out to gather material for the book, and these supplemented by hours spent in law libraries. Such labor is only rendered possible by the strong desire that all ascertainable facts shall be known about the subject considered, the desire which is the basic motive of all truly scientific work.

No one who critically examines this book or goes to it for help, can fail to feel an added respect for its author and for the spirit of devotion to applied science and humanity that has prompted and sustained him in such an undertaking.

E. J.

DYNAMIC OCULAR TESTS, by Charles Sheard, Ph. D. 12mo., 143 pages, 33 illustrations. Columbus, Ohio. Published by the Author. Cloth, \$1.50; Paper, \$1.00. Columbus, Ohio, or any wholesale optical company.

Quite satisfactory explanations are here given, especially of the practice of "dynamic skiametry" in optical examinations. Indeed, it is so exhaustively treated that it may be esteemed a scientific essay for the use of the medical profession, and decidedly over the head of the refracting optician.

Certainly one can learn a great deal about refraction and accommodation without cycloplegia, but it goes without saying that such an examination of the eye is on a par with an examination of the heart or lungs through the clothes.

Be this as it may, the economic co-ordination of accommodation convergence and fusion convergence, which is to be taken into consideration in the prescribing of glasses is always to be done in the presence of active working of the ciliary body; and in many cases it greatly modifies the prescription of working lenses. Hence the study of such a book as this is of distinct value and it is recommended as such.

H. V. W.

In the literature of Optometry, there is an evident aim to be scientific and professional, altho it is often unpleasantly evident that these aims have been widely missed. A divergence of this kind is exhibited in the illustrative diagrams in this book, which use as test words "Applied Optics Ohio State University," a phrase that constitutes a perpetual reminder of its author's work as a teacher.

Nevertheless, there is a lesson to be learned from this book as to the importance of attention to minute details in practical work for the correction of anomalies of refraction and muscle balance—something that many ophthalmologists in active practice fail to appreciate. The emphasis here given to the practical importance of relative accommodation and convergence would be a wholesome corrective to some of the current routine methods of dealing with refraction cases.

E. J.

CORRESPONDENCE.

Ophthalmia Neonatorum Law.

To the Editor:—Dr. Frank Allport, in his letter regarding my article entitled "A Composite Ophthalmia Neonatorum Law," says, "In the first paragraph of the article he (Dr. Shastid) lays down the dictum, in italics, that the most important part of the whole procedure is the use of what he calls 'the Cr  d   drops' at birth * * * But when he uses the substitutes—argyrol and protargol—he is not using the Cr  d   treatment."

My answer is that I have been guilty of no real inconsistency. In the first

paragraph of the article I was quoting a passage which expressed precisely my opinion, which as to the use of silver nitrat, coincides with Dr. Allport's. In the later portion of the article I was endeavoring to produce a composite ophthalmia neonatorum law. Let us take a familiar illustration. When a photographer makes a composite photograph of a family, lodge, or other group, he may, it is true, do a little retouching, but he does not try (if wise) to make of the composite photograph an ideal photograph—i. e., a representation of his own conception of what the human countenance ought to be. He merely eliminates the slighter defects, and the more important, or more salient, any given feature of the picture is, the more the photographer will attempt to preserve that feature. Such a feature belongs in a composite photograph. It is a group characteristic.

Now, it is Dr. Allport's failure to distinguish between my own ideal of a law on the matter in question and my well meant endeavor to produce a composite photograph of the laws already existing that made him think me inconsistent.

It is true that I speak in the article of producing "a law which should meet, as far as I could make it do so, the actual requirements of the situation." But an actual part of the situation, and one that is not to be ignored, is the fact that many doctors, even ophthalmologists, do not value the various prophylactics against ophthalmia neonatorum quite as do Dr. Allport and I. Did not this important difference of opinion exist, then we should not be able to find (as, however, we do actually find) that a number of existing statutes permit the use of argyrol and protargol, as well as of silver nitrat. I thought that a composite law would be the more likely to be a viable law because of its very compositeness.

I have said, or at least implied, that Dr. Allport's opinion as to the relative values of the three prophylactics mentioned in the proposed form of law is the same as mine. That is, not quite

true. I agree with the doctor that the silver nitrat stands at the head of the list. But when the doctor says that "neither [argyrol nor protargol] is sufficiently strong [i. e., bactericidal] to be regarded as a safe prophylactic in the eyes of new born children," I believe he misappreciates these substances. For one thing, the question is not merely (I do not say "at all") a question of bactericidal powers. This phase of the question has been sufficiently dwelt upon by others, and need not here be expanded. I may also mention that a very careful accoucheur in a Paris hospital reported, ten or fifteen years ago, a very large number of births in which the only prophylactic that had been employed was simply normal salt solution. And there had not been one single case of ophthalmia neonatorum sequent on this measure.

It has also been contended that the weaker prophylactics (protargol and argyrol) have their weakness very much more than counterbalanced by the fact of their utter harmlessness; for (it is said) even a one per cent solution of silver nitrat is not totally devoid of danger if more than two or three minims thereof should be employed at one time. And doctors are often hurried, or stiff in the use of the fingers, so that more of the solution than is intended is now and then actually introduced. I have personally seen an accoucheur repeat the instillation of silver nitrat a considerable number of times in the course of a very few minutes. There is no prophylactic against blundering prophylaxis.

I, for one, am willing to agree that a one per cent solution of silver nitrat is the very best of all the various prophylactics against ophthalmia neonatorum. The practical question is this, Will the doctors in any given state submit to being restricted to the use of that one solution—nitrat of silver? If they will, I too am willing. Let us save babies' eyes. Moreover, let us have in all the states a law that is just as nearly uniform as possible.

In conclusion I wish to acknowledge an indebtedness which I ought to have mentioned in the article in which I

proposed the law in question. I refer to the excellent collection of ophthalmia neonatorum laws of the different states which appeared in "Ophthalmology," a number of year ago, and which owes its existence to the industry and humanity of Dr. Frank Allport. I did not wholly rely upon that collection, it is true, but consulted some original statutes in addition. Yet I found the collection of very great service, and, if it be not now too late, I wish to acknowledge my indebtedness to Dr. Allport's collection.

Very sincerely yours,

THOMAS HALL SHASTID.

Superior, Wis.

Methylene Blue for the Cornea.

To the Editor:—Let me add something to the correspondence published in the American Journal of Ophthalmology concerning the treatment of corneal ulcers with Methylene-blue.

The method used by me for the past six years was taught me by Dr. Meyer Weiner of St. Louis, Mo., and I find it an excellent treatment in old, deep, sloughing ulcers with undermined edges, where they seem so hard to clean.

Use one drop of saturated aqueous solution of methylene-blue every fifteen minutes until the patient has had six drops, instilling cocain to control pain. Finally dust surface of ulcer with powdered methylene-blue and apply a light protective bandage. At the end of twenty-four hours it will be seen that the blue has filtered through into the anterior chamber, and permeated the cornea all around the ulcer. This is followed by instillations of atropin 1 per cent. I have seen some beautiful results from it.

Sincerely yours,

T. WALKER WEAVER.

Wichita, Kan.

BIOGRAPHIC NOTICES.

FLORENCE MAYO SCHNEIDEMAN, M. D.

PHILADELPHIA.

Continued from page 296.

MELLINGER, CARL, professor of ophthalmology and chief of the eye clinic of the University of Basel, died suddenly, May 21st. He contributed numerous articles relating to ophthalmology to both French and German journals, but will be best remembered for the inner-pole magnet devised to remove foreign bodies from the interior of the eyeball, which he first brought to the attention of the profession at the Tenth International Congress of Ophthalmology, held in Lucerne in 1904.

MILLS, JAMES, aged 65, of Janesville, Wis., a specialist on diseases of the eye, ear, nose and throat, was drowned in the Rock River, Janesville, Nov. 18th.

MOFFAT, JOHN LITTLE, of Ithaca, N. Y., a member of the American Ophthalmological, Otological and Laryngological

Society, for several years consulting ophthalmologist to the Cumberland St. Hospital, Brooklyn, editor of the *Journal of Ophthalmology, Otology and Laryngology* from 1901 to 1904; and of the *Homeopathic Eye, Ear and Throat Journal* from 1905 to 1910, died at his home Feb. 18th, from tuberculosis, aged 63.

NEILL, WILLIAM JOHN, of Chicago, an ophthalmologist, died at his home April 18th, from arteriosclerosis, aged 66 years.

NIEDEN, ADOLF, of Bonn, died during the latter half of the year, at the age of 70. He was once assistant to Saemisch. In 1874 he settled in Bochum as an ophthalmic surgeon, and left for Bonn in 1902. His investigations upon miners' nystagmus are well known, as are also

his several publications upon occupational diseases of the eye.

PERGENS, E., died during the latter half of the year in Maesyck, Belgium, where he was born and practiced. He made many investigations dealing with optotypes and wrote extensively upon the historical aspects of general medicine and ophthalmology. He was a foundation member of the Oxford Ophthalmological Congress.

PITCHER, MORRIS, Tuft's College Medical School, 1900, a specialist in diseases of the eye, ear, nose and throat, died at his home, Sardinia, N. Y., Jan. 17th, aged 31.

POSEY, ADDISON CORNELIUS, of Hanford, California, aged 68, a specialist in diseases of the eye, ear, nose and throat, was found dead in his home, May 31st, from heart disease.

PRITCHARD, MAHLON R., College of Physicians and Surgeons, Baltimore, 1880, former president of the Tioga County, Pa., Medical Society, a specialist on diseases of the eye, ear, nose and throat, died at his home, Westfield, Pa., Feb. 23rd, aged 64 years.

REILY, CHARLES GUY, of Los Angeles, a specialist in diseases of the eye, ear and throat, died at his home, May 26th, aged 58 years.

RICHARDSON, ROBERT McALLISTER, of Chattanooga, Tenn., a specialist on diseases of the eye, ear, nose and throat, died at his home, Sept. 18th, from tuberculosis.

ROBINSON, GEORGE WILLIS, of Shreveport, La., University of Pennsylvania, 1895, for three years house surgeon of the Manhattan Eye, Ear, Nose and Throat Hospital, New York City, died at his home, Feb. 4th, from pneumonia, aged 53.

ROBINSON, SAMUEL R., of Sturgis, Mich., a specialist in diseases of the eye, ear, nose and throat, died June 13th, after a surgical operation, aged 65 years.

SANTA CRUZ, MIGUEL, director of the National Ophthalmic Institute in Madrid, died during the latter half of 1916.

SARGEANT, FRANK LORING, of Victoria, Texas, died at his home, Nov. 11th, aged 45.

SCHIRMER, OTTO W. A., University of Griefswald, Germany, 1888, professor of diseases of the eye in the New York Post Graduate Medical School, ophthalmologist to the Knapp Memorial, St. Mark's and Bronx hospitals, New York, died May 6th, aged 52 years.

SCHOEN, PROF. W., of Leipsic, died during the latter half of the year at the age of 69.

SCHUR, MAX, born at Kitzingen in 1885, for a long time assistant in the eye clinic of Tubingen, died at Neu-Gaiesanka (Roumania) in 1916.

SHERMAN, HARRIS GRAY, of Cleveland, Ohio, a member of the American Academy of Ophthalmology and Otolaryngology, and American Ophthalmological Society, first medical inspector of schools of Cleveland, died Oct. 30th, aged 61, from pneumonia.

SNODGRASS, JESSE, of Kenton, Ohio, a specialist on diseases of the eye, ear, nose and throat, at one time president of the Northwestern Ohio Medical Association, Assistant Surgeon of the Eighth Tennessee Volunteer Infantry during the Civil War, died Dec. 8th, aged 77.

STANCULEANU, GEORGE, Professor of Ophthalmology in the University of Bucharest until the German invasion, died August 15th, at a sanatorium at Stamford, Conn., U. S. A. He was born in Roumania in June, 1874, and graduated in medicine at Paris. He was appointed Professor in the University of Bucharest in 1908, and since that time has been one of the most active writers and teachers of ophthalmology in Europe. His salary as Professor of Ophthalmology was divided among his assistants in amounts proportionate to their respective positions and lengths of service. Those who visited his clinic were most courteously received and given every available opportunity for observation and operation and found their contact with his work most instructive and inspiring. His day at the hospital began at 7:30 or 8 o'clock in the morning and ended with literary work in the evening.

With the entrance of Roumania into the war he placed his services at the dis-

posals of his government; and with the disastrous collapse of the Roumanian defense he found his way to Moscow. After annoying and wearing delay he made his way by Vladivostok to San Francisco, to solicit American help for the Roumanian Red Cross and Roumanian army. But prolonged overexertion and emotional strain caused a complete mental break down, which terminated in pneumonia. He will be most widely remembered for his operation for extraction of the crystalline lens in the capsule, having first systematized the use of the capsule forceps, which he had devised for this purpose. He cultivated close relations with the ophthalmologists of other countries; and had participated in the proceedings of the Oxford Ophthalmological Congress.—(H. F. Hansell. *Ophthalmic Record*, v. 26, p. 598.)

TREITEL, PROF., of Königsberg, well known for his researches upon the light sense, died during the year.

VIBBARD, ARTHUR ALONZO, of Albany, N. Y., a specialist on diseases of the eye, ear and nose, died at his home, Jan. 19th, from pneumonia, aged 48 years.

WALKER, GORDON ALLEN, R. N., a former Ophthalmic House Surgeon at the Royal Infirmary, Sheffield, was killed in action Nov. 14, 1916, aged 28 years.

WALLING, W., Chicago, died during the latter half of the year, aged 68 years.

WINSLOW, WILLIAM HENRY, an officer in the U. S. Navy during the Civil War, a specialist on diseases of the eye, author of many historical novels concerning the Civil War, died at his home in Roxbury, Boston, April 8th, from pneumonia, aged 76 years.

WOLFF, B., New York, died during the latter half of the year, aged 42 years.

ZEHENDER, PROF. W. VON, once Professor of Ophthalmology in the Universities of Bern and Rostock, died during the first half of the year at the age of 91. In December, 1862, he founded the *Klinische Monatsblätter für Augenheilkunde*, which he continued to edit for thirty-seven years, when he transferred it to Axenfeld. In this journal are to be found most of a long series of papers that he wrote.

BIOGRAPHIC SKETCHES.

THOMAS HALL SHASTID, M. D.

SUPERIOR, WISCONSIN.

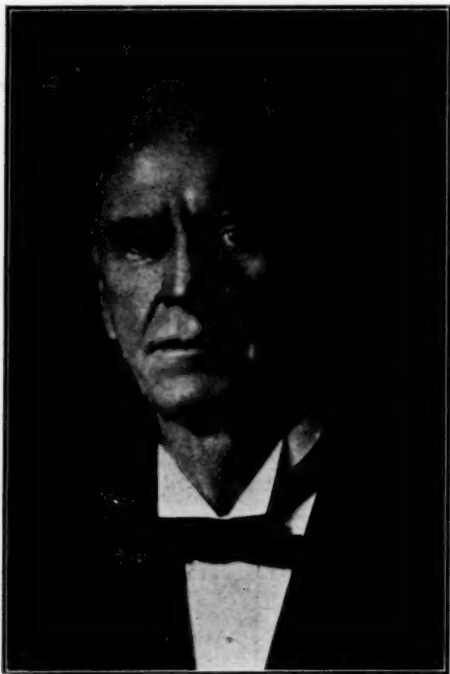
CHARLES HENRY CASTLE, a well-known ophthalmologist of Cincinnati, O., died January 21, 1918. He was born at Philadelphia, Penna., son of James H. and Phoebe Ann (Dick) Castle, November 28, 1862. His general education was received at the University of Pennsylvania, and his medical degree at the Miami Medical College, Cincinnati. From 1886 till 1890 he was receiving physician at the old Cincinnati Hospital, and from 1889 till 1899, a period of ten years, he studied the eye, ear, nose and throat with Dr. Robert Sattler, of Cincinnati. He was afterwards on the staff of Dr. Christian R. Holmes's private hospital. Dr. Castle was the first to use the Roentgen ray in Cincinnati, was one of the founders of the new Cincinnati General Hospital, a medical director of the The Federal Union Life Insurance Co., and a Fellow of the American College of Surgeons. He was a man of medium height, lean, muscular and very active. He married in 1905 Miss Meurice Abell. Of the union was born a son, Archibald. Dr. Castle's death is deeply regretted by the medical profession of Ohio.

ALBERT JEFFREY COX, ophthalmologist and oto-laryngologist of Superior, Wis., died of general arterio-sclerosis March 13. He was born at Trempealeau, Wis., March 2, 1862, was graduated at the Galesville, Wis., University, and at Rush Medical College, Chicago. He practiced in southern Minnesota for 26 years, and at Superior, Wis., for 4 years. He was a man of kindly, generous impulses, and had numerous friends.

ROBERT LOVE MOORE, of Columbia, S. C., died at the Columbia Hospital in that city, January 4, 1918. He is said to have had the largest ophthalmic and oto-laryngologic practice in the state. He was born at McConnellsville, York county, S. C., May 12, 1872, son of Joseph Palmer and Agnes Love Moore. His medical degree was received at the

University of Maryland, Baltimore, in 1896. He married Caroline C. White, of Rock Hill, S. C., May 31, 1899, and removed to Columbia in 1903.

He was resident physician to the Presbyterian Eye, Ear, Nose and Throat Hospital, Baltimore, in 1894-95, and oculist to the University of South Carolina from 1903 until his death. He was a small, stout man, fair and ruddy, and very quiet and deliberate in his manner. He was for years a deacon in the First Presbyterian Church, later an



Flavel B. Tiffany, 1846-1918

elder and the superintendent of the Sunday school. Excessive application to his practice caused a breakdown from which he could not recover.

FLAVEL BENJAMIN TIFFANY.—His friends in the ophthalmologic profession were shocked and grieved to learn of the death of Dr. Flavel B. Tiffany, of Kansas City, Mo. Born at Cicero, Oneida, county, N. Y., April 28, 1846, son of Ambrose and Electa Shepard, Tiffany, he early removed with his parents to Rutland, Dane county, Wisconsin, and afterward to Baraboo. The following year he removed again, to Rice

Lake, Minn., where his mother died.

The war breaking out, he enlisted at the age of seventeen in Battery B, Fourth Minnesota Light Artillery, and served till the close of the strife. Returning to Minnesota, he went to school at Faribault, living with a Dr. Bemis, and doing manual labor for his board. Before he was twenty years of age, he entered the State University at Minneapolis, but could not quite complete the literary course because of failing health, the result of overwork and great privations.

In 1872 he entered the Medical Department of the State University at Ann Arbor, Mich., receiving the degree of M. D. in 1874. He settled at first in Grand Haven, Mich., but, being unsuccessful, went again to Minnesota, thence to East St. Louis, where, however, he was once again unsuccessful. Returning once more to Minnesota, he was ably assisted by a worthy and wealthy lady, Mrs. Esther Fuller, and, settling at a town called Medford, soon had a very large practice.

In 1876-7 he studied the eye, ear, nose and throat at London, Berlin, Vienna, and Paris, in the latter city meeting Miss Olive E. Fairbanks, whom he afterwards married in Kansas City, in 1879.

In 1878 he settled as ophthalmologist and oto-laryngologist at Kansas City, Mo., and soon was widely known as lecturer and operator. In 1880 he founded the Kansas City University, in which institution he held the chair of ophthalmology, otology and microscopy till 1893. The chair of ophthalmology and laryngology he continued to hold till about the time of his death. For many years he was president of the institution.

Dr. Tiffany was oculist to the Burlington and the Missouri, Kansas and Texas railways. He was a Fellow of the American Medical Association, the Mississippi Valley Medical Association, Missouri Valley Medical Association, and the Tri-State Medical Association. He was president once of each of the two last mentioned organizations. He was also a member of the

City Club, of the Knife and Fork Club, a Republican, and an active member of the Episcopal church.

Dr. Tiffany was a small, spare man, smooth-faced, of fair complexion and with blue eyes and brown hair. He was brisk, alert, frank and friendly. Fond of travel, he made the "grand tour" twice, and sixteen separate trips to Europe. He liked music, and was greatly interested in the French language and people.

Dr. Tiffany's first wife died in 1910. In September, 1912, he married Miss Zoe Clark. Of this union were born two children, Flavel B. and Mary

Louise. The Doctor was 68 years of age when his son was born, and, as he often declared, this child was the crowning happiness of his life. He died at St. Luke's Hospital, Kansas City, Mo., January 4, 1918, of arterio-sclerosis.

Dr. Tiffany wrote numerous books and articles, the most important of the former being "Anomalies of Refraction and Diseases of the Eye," 1894; "A Trip Around the World by an Oculist;" "A Sojourn in Switzerland;" and "A Sojourn in Spain." The more important journal articles deal with cataract and glaucoma.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. As these columns go to press on the 30th of the month contributors should send in their items by the 25th. The following gentlemen have consented to supply the News Item Editor with the news from their respective sections: Dr. H. A. Beaudoux, St. Paul; Dr. James A. Black, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. A. E. Davis, New York City; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. George F. Keiper, La Fayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. Holbrook Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. George M. Waldeck, Detroit; Dr. Oscar Wilkinson, Washington. It is desirable that this staff shall be enlarged until every city of importance in the United States shall be covered as well as all foreign countries. Volunteers are therefore needed and it is hoped that they will respond promptly to this call.

DEATHS.

Prof. E. Hering, of Leipsic, died recently at the age of 83 years.

Dr. Kenneth Scott, of London, died February 19th, after an operation for appendicitis.

Dr. T. de Speyr, of Chaux-de-Fonds, Switzerland, died recently at the age of 50 years.

CORRECTIONS.

The paper of Dr. Robert Scott Lamb, in the March number of the JOURNAL, (p. 183), was read before the Society of Ophthalmologists and Otologists, of the District of Columbia, November, 1917.

In the March number of the JOURNAL, (p. 209), the *Anales de Oftalmologia* is mentioned as closing its fifth volume. This should read, seventeenth volume.

In Dr. Franklin's article, page 237, column 1, line 35, should read "by itself produce a complete stereoscopic effect." Page 236, last line column 1 should read "association of stereognostic memory."

PERSONALS.

Dr. E. H. Cary, of Dallas, Texas, is President of the Texas State Medical Society.

Dr. Fred Stauffer, of Salt Lake City, is President of the Utah State Medical Society.

On May 20th, Lieut.-Col. W. H. Wilmer of Washington, who is stationed at Mineola, L. I., will read a paper before the Section of Ophthalmology of the N. Y. Academy of Medicine.

Dr. Clark W. Hawley, of Chicago, has just undergone an operation for gall-bladder disease, and is making a good recovery.

Dr. John F. Campbell, of Chicago, has resumed his practice after an absence of about ten weeks, touring most of the western part of the continent.

Dr. Samuel D. Risley, of Philadelphia, will be the guest of honor at the coming meeting of the Eye, Ear, Nose and Throat Section of the State Medical Society at Columbus, Ohio. His address will be upon the subject of "Uveal Disease."

Dr. William Campbell Posey, of Philadelphia, delivered an address before the Quarterly Meeting of the Rhode Island Medical Society on "Some Industrial Injuries of the Eye" on March 7th, 1918. The lecture was illustrated with numerous slides. Dr. Posey is serving the Government as a member of one of the Local Examining Boards.

COMING MEETINGS.

Section on Ophthalmology, American Medical Association, Chicago, June 11-14.

American Ophthalmological Society, Eastern Point, New London, Conn., July 9-10.

Oxford Ophthalmological Congress, Oxford, England, July 10-12.

American Academy of Ophthalmology, and Oto-Laryngology, with the Fourth Colorado Ophthalmological Congress, Denver, Colorado, August 5, 6, 7.

Pacific Coast Oto-Ophthalmological Society, Salt Lake City, August 12-13.

SOCIETIES.

Dr. S. Lewis Ziegler was elected acting President of the Ophthalmic Section of the College of Physicians for 1918.

Dr. William T. Shoemaker, the President of the Section, is with the Pennsylvania Hospital Unit in France.

Dr. G. Oram Ring, of Philadelphia, was recently appointed by the acting president of the College of Physicians, Dr. Thomas R. Neilson, as the ophthalmic member of the Alvarenga Prize Committee of the College.

Dr. Samuel D. Risley, Dr. S. Lewis Zeigler and Dr. William Campbell Posey, of Philadelphia, have been appointed as the Executive Committee of the Ophthalmic Section of the College of Physicians by the acting president for 1918.

Detroit has an Ophthalmological Club which is unique in more ways than one. Founded many years ago by several of the prominent eye men, it has been a source of ever increasing good fellowship among Detroit ophthalmologists. The club has no officers except a secretary. Each member in alphabetical order takes his turn as chairman at the monthly meetings, gives a dinner to his fellow members and presents a paper for their consideration. Cases of interest are presented before the meeting, and after the dinner a general discussion of paper and cases ensues. There are at present 18 members, six of whom are in active service in the army and two others hold commissions in the O. M. R. C. awaiting call.

The Oxford Ophthalmological Congress will assemble at Keble College, Oxford, on the evening of Wednesday, July 10th, 11th, and 12th. Thursday, the 11th, will be devoted to a discussion on "Ophthalmology and the War," to be opened by Sir William Job Collins, K. C. V. O., M. P. Friday, the 12th, will be given up to papers, demonstrations, and cases. No Official Dinner will take place. The Master of the Congress, Sydney Stephenson; Hon. Secretary, Bernard Cridland, of Wolverhampton.

The meeting of the American Academy of Ophthalmology and Oto-Laryngology, in Denver, August 6th, 7th, and 8th, under the presidency of Major Allen Greenwood, will devote one session to the "Reconstruction and Re-education of Disabled Soldiers." It will take the place of the meeting of the Fourth Colorado Ophthalmological Congress, and during the week following, August 12-13, the Pacific Coast Oto-Ophthalmological Society will be

held at Salt Lake City, Utah. It is expected that some members of the latter society will attend the Denver meeting, and members of the Academy, after the close of their meeting, will be able to make the trip to Salt Lake City, stopping at points of interest on the way.

MILITARY NOTES.

Dr. H. S. Gradle, Assistant to the Division Surgeon at Camp Grant, has been promoted to the rank of Major.

Major Thomas Woodruff, of Chicago, has been transferred to Camp Beauregard, Alexandria, Louisiana.

Lieut. Marcel Danis, of Brussels, one of our Collaborators, is in charge of the Eye Department in one of the hospitals at the Belgian front.

Captain Weekers, Professor of Ophthalmology at the University of Liege, has charge of the Eye Department in a hospital at the Belgian front.

Captain Louis Levy, of Memphis, Tenn., has been sent to Camp Mineola, Long Island, for duty.

Lieutenant J. Norman Risley, formerly of Philadelphia, Junior Medical Officer, Newport Training Station, Newport, Rhode Island, is doing special work in the eye, ear, nose and throat, preparing recruits for sea service.

Colonel Warlomont, of Brussels, Lieut.-Col. van der Straeten, Professor of Ophthalmology at the University of Louvain, Lieut. van Schevensteen, Jr., of Antwerp, and Lieut. Moret, of Charleroi, are on active duty in Belgian hospitals in France.

Lieut. W. W. Sauer, of Marietta, Ohio, enlisted as ophthalmic surgeon, M. R. C., has been assigned to duty in the Medical Research Laboratory, Hazelhurst Field Aviation Section Signal Corps, Mineola, Long Island, N. Y. Dr. A. J. Swezey of Iowa has assumed his practice during his absence.

Major Farrell, of Chicago, who has been home on a short leave of absence, while convalescing from his recent attack of pneumonia, brought back an interesting souvenir from the camp. A fragment of tin, 21 mm. long and 16 mm. wide, which was a part of a hand grenade that entered the eye through the upper lid, and was removed with forceps. About 25 per cent of the vitreous was lost. Bombs used in training are made from empty tin cans. Major Farrell has been obliged to enucleate several eyes injured in trench training.

Captain H. Maxwell Langdon, of Philadelphia, who was commissioned last July, remained in charge of the ocular examination of candidates for the Section of Aviation until February 23rd, when the work was discontinued temporarily because of the fact that the schools have their full quota of students. The examinations were made at the University of Pennsylvania.

Major George E. deSchweinitz, of Philadelphia, recently returned from a three months' tour of the base hospitals of France. The trip was undertaken at the request of the Surgeon

General for purposes of inspection of equipment along ophthalmologic lines. He is at present in Washington on official business but is expected to return to address the undergraduate school of the University of Pennsylvania on April 18th upon the results of his observations.

The names of the ophthalmologists serving on medical advisory boards of Philadelphia are as follows: Episcopal Hospital—Dr. G. Oram Ring, Dr. Harold G. Goldberg, Dr. William T. Van Pelt; Germantown Hospital—Dr. Howard D. Geisler, Dr. Carl Williams; Hahnemann Hospital—Dr. Frank O. Nagle; Jefferson Hospital—Dr. Howard F. Hansell, Dr. J. Scott Fritch, Dr. Charles R. Heed; Jewish Hospital, Dr. J. C. Knipe, Dr. Aaron Brav; Lankenau Hospital—Dr. Joseph Smith; Medico-Chirurgical Hospital—Dr. L. Webster Fox, Dr. O. F. Mershon; Methodist Episcopal Hospital—Dr. J. B. Turner, Dr. A. R. Renninger, Dr. W. W. Watson, Dr. T. W. Tait; Orthopedic Hospital—Dr. Hunter Scarlett; Presbyterian Hospital—Dr. James Thorington, Dr. McCluney Radcliffe; St. Agnes Hospital, Dr. J. A. Brophy, Dr. B. L. Gordon, Dr. W. C. Posey; St. Mary's Hospital—Dr. Lewis Love, Dr. Frank A. Murphy; St. Timothy's Hospital—Dr. Carl Williams, Dr. David Boon; Samaritan Hospital—Dr. L. C. Peter, Dr. G. A. Lawrence; University of Pennsylvania Hospital—Dr. H. Maxwell Langdon.

DETROIT MILITARY NOTES.

Capt. Wm. A. Macdonald has been in the British service at a Canadian eye hospital in France for the past year.

Capt. Ray Connor has just been called into active service and is now stationed at Cape May.

Capt. Robert Beattie, Lieut. Frank B. McMullen and Capt. Byron H. Jenne are commissioned in the Medical Reserve Corps awaiting call for active service.

Capt. George Frothingham has been in charge of the examination of the aviators in Detroit for the past eight months and is now expecting to leave shortly for service elsewhere.

Lieut. Frank Ryerson, who has assisted Capt. Frothingham in this aviation work, will accompany him. Lieut. Eugene Smith, Jr., is with Base Hospital No. 36 in France. Lieut. Duncan Campbell is with Base Hospital No. 17 in France. Lieut. Glenn Bulson is located at Fort Meyer.

Dr. Fred L. Johnson is leaving for France this month to join the Harvard University Base Hospital Unit No. 22 in the British service, with the commission of first lieutenant in charge of the eye, ear, nose and throat work.

Dr. Walter R. Parker, who has been in active service since last July, has recently been transferred to the National Army and made a Lt.-Col. in charge of the Section of Surgery of the Head, in the Surgeon General's office at Washington.

MISCELLANEOUS.

Owing to the great scarcity of paper the

Directors of the British Journal of Ophthalmology have decided as a temporary measure to reduce the number of pages in the Journal from an average of 64 to an average of 48.

Rosie Cohen, 9 years old, and blind, saved the lives of 16 other blind children at the Blind Babies' Home in Brooklyn. Awakened by smoke the girl groped her way through the rooms on the second floor, aroused each sleeping child, and quietly marshalled them into a court yard in the rear of the house. Officials of the home were not awakened until the children were passing out of the blazing building.

HONOR LIST.

This is a list of Ophthalmologists *now* in Service, in the Medical Department of the United States Army, arranged alphabetically by states.

ALABAMA

Lieut. Perdue, Jas. D. Mt. Vernon.

ARKANSAS

Lieut. Ramsey, J. W. Jonesboro.
Capt. Vinsonhaler, F. Little Rock.

CALIFORNIA

Lieut. Dingeman, F. J. San Diego.
Lieut. Hosford, W. J. Santa Cruz.
Lieut. Ide, Clarence E. Los Angeles.
Capt. Roberts, W. H. Pasadena.
Maj. Swift, E. L. H. Los Angeles.
Capt. Tupper, George. Long Beach.
Maj. Wagner, H. L. San Francisco.

COLORADO

Capt. Bane, Wm. M. Denver.
Capt. Finnoff, W. C. Denver.
Maj. Magruder, A. C. Colorado Springs.
Lieut. Sedwick, W. A. Denver.
Lieut. Shields, J. M. Grand Junction.
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Lieut. Cowan, A. Philadelphia.
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Capt. Eber, S. I. Pittsburgh.
Maj. Franklin, Clarence P. Philadelphia.
Capt. Gerhardt, P. H. Reading.
Lieut. Herbert, J. F. Philadelphia.
Lieut. Johnson, Elmer E. Philadelphia.
Lieut. Kaucher, C. L. Philadelphia.
Capt. Meanor, W. C. Pittsburgh.
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Capt. Hawkins, J. F. Providence.
Lieut. Means, P. C. Apponaug.

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Lieut. Crawford, J. P. Nashville.
Maj. Ellett, E. C. Memphis.
Lieut. Hall, G. M. Lenoir City.
Capt. Miller, T. P. Nashville.
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Lieut. Compere, D. C. Dallas.
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Capt. McLean, F. T. El Paso.
Capt. Ralston, Wallace. Houston.

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Lieut. Gillespie, W. W. Milwaukee.
Maj. Hogue, Gustavus I. Milwaukee.
Lieut. Provost, A. J. Oshkosh.

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STATE UNKNOWN
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Capt. Cooper, E. H.
Maj. Davis, W. T.
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Lieut. Miller, T. A.
Capt. Osgood, W. W.
Lieut. Powers, M. H.
Lieut. Price, H. H.
Lieut. Prince, L. H.
Lieut. Reeves, A. C.
Lieut. Ryan, A. F.
Capt. Scott, J. R.
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OPHTHALMIC LITERATURE.

Under this head continuing the "Index of Ophthalmology" heretofore published in *Ophthalmic Literature* will be found the subjects of all published papers received during the last month, that bear to an important extent upon ophthalmology. The subject is indicated rather than the exact title given by the author. Where the original title has been in a foreign language it is translated into English. The journal in which the paper is published will indicate the language of the original.

The names of the different journals are indicated by abbreviations which generally correspond to those used by the *Index Medicus*, the *Journal of the American Medical Association*, and the *British Journal of Ophthalmology*. We will from time to time publish the list of ophthalmic journals, with the abbreviations used for each. Often a single letter discriminates between journals published in different languages. Thus "Arch. of Ophth." refers to the *Archives of Ophthalmology*, published in English; "Arch. d'Ophth." indicates the French *Archives d'Ophthalmologie*; "Arch. de Oftal." refers to the *Archivos de Oftalmologia Hispano-Americanos*, while "Arch. di Ottal." indicates the Italian *Archivio di Ottalmologia*.

In this index of the literature the different subjects are grouped under appropriate heads; so that all papers bearing on the same, or closely related subjects, will be found in one group. The succession of the groups is the same from month to month, and identical with that of the *Digest of the Literature*. Where a paper clearly refers to two subjects that belong in different groups, it will be noticed in both groups.

Each reference begins with the name of the author in heavyface type. This is followed by the subject of his paper. Then in brackets a number with (ill.) indicates the number of illustrations, or a number with (pl.) the number of plates illustrating the article, (col. pl.) indicates colored plates. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that the paper was read before some society and gave rise to a discussion which is published with it.

The "repeated titles" may render accessible the essential part of a paper, the original of which could not be consulted. These give (in brackets) after the author's name the volume and page of this department of "Ophthalmic Literature" where the title of the paper will be found; and then the journal, volume, and page where the translation or abstract is published.

It is desired to notice every paper as soon as possible after it is published. Readers will confer a favor by sending titles they notice have been omitted, with journal and page of publication; and of their own papers, sending either a copy of the journal in which each appeared, or a reprint. These should be sent as soon as possible to 318 Majestic Building, Denver, Colorado.

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The Digest of the Literature, omitted from this issue, will be continued in the June number.